

Appendix A

Baseline Watershed Assessment Watershed Field Inventories and Land Use Regulatory Review (CD-ROM)

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Baseline Watershed Assessment Tankerhoosen River Watershed

Friends of the Hockanum River Linear Park of Vernon, Inc.

In Association With:

Town of Vernon North Central Conservation District Rivers Alliance of Connecticut Hockanum River Watershed Association Belding Wildlife Trust

Vernon, CT

May 28, 2008



Fuss & O'Neill, Inc. 78 Interstate Drive West Springfield, MA 01089



BASELINE WATERSHED ASSESSMENT Tankerhoosen River Watershed

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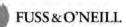
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1.0 INTRODUCTION

The Friends of the Hockanum River Linear Park of Vernon, Inc. (the "Friends") has retained Fuss & O'Neill to prepare a Watershed Management Plan for the Tankerhoosen River watershed. The Watershed Management Plan will be developed through a collaborative effort with a Technical Advisory Committee consisting of the Friends, the Town of Vernon (Planning Department and Conservation Commission), the North Central Conservation District, the Hockanum River Watershed Association, Rivers Alliance of Connecticut, and the Belding Wildlife Trust. The first part of the plan will consist of an assessment of existing conditions in the watershed, an evaluation of pollutant sources in the watershed to prioritize watershed protection and restoration strategies, as well as prioritization of action items that could be adopted by governmental agencies and private groups to protect and improve the health of the Tankerhoosen River watershed. The recommended plan will be developed to address the priorities and issues identified in previous phases of the plan development, with participation by the Technical Advisory Committee.

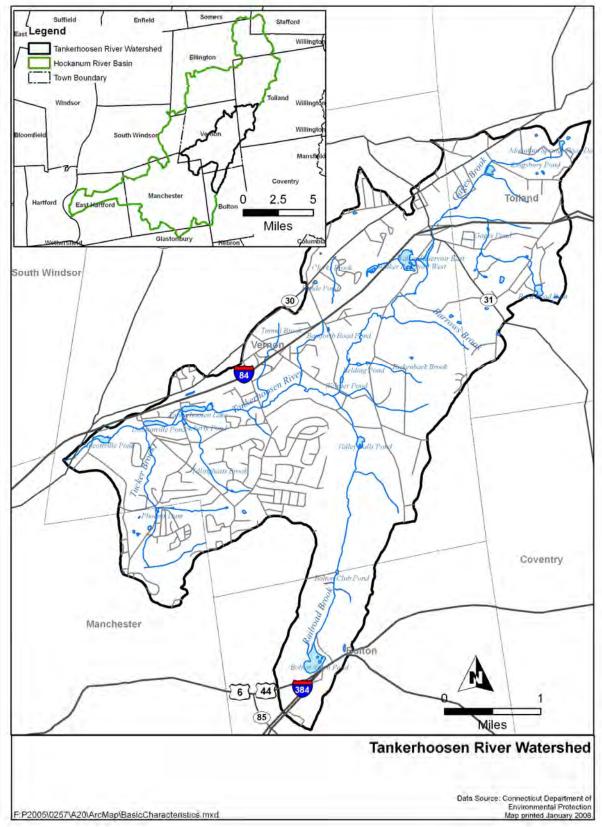
2.0 BACKGROUND

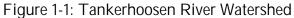
The Tankerhoosen River watershed is a small but very important 12.85 square-mile subregional basin within the Hockanum River watershed (<u>Figure 1-1</u>). Approximately 70% of the watershed is located within the Town of Vernon, with the remaining portions within the Towns of Tolland, Bolton, and Manchester (<u>Table 1-1</u>).

Town Name	Town Acreage	Acreage in Watershed	% of Town in Watershed	% of Watershed
Manchester	17,408	461	2.7	5.6
Vernon	11,904	5,572	46.8	67.9
Tolland	25,856	1,547	5.9	18.6
Bolton	9,920	646	6.5	7.9
Totals	65,088	8,226		100.0

Table 1-1: Distribution of Municipalities in the Tankerhoosen River Watershed

A basic profile of the watershed is provided in <u>Table 1-2</u>. Later sections of this document provide more detailed information on these watershed characteristics.



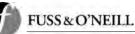


	12.85 square miles (8,226 acres)
С	approximately 17.2 miles
С	10 subwatersheds
С	4 towns and cities
С	2006 DEP Impaired Waters List for habitat for fish and
	other aquatic life
С	9.8%
С	Clarks Brook
С	Gages Brook
С	Gages Brook South Tributary
С	Lower Tankerhoosen River
С	Walker Reservoir
С	Clarks Brook
С	Gages Brook
С	Lower Tankerhoosen River
С	Middle Tankerhoosen River
С	Tucker Brook
С	Interstates 84 and 384
С	U.S. Routes 6 and 44
С	State Routes 30 and 31
С	Belding Wildlife Management Area
С	Valley Falls Park
С	Northern Connecticut Land Trust
С	Bolton Notch Pond
С	Walker Reservoir
С	Talcottville Historic District
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Table 1-2: Profile of the	Tankerhoosen	River Watershed
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The high water quality (classified as A) in the upper regions of the Tankerhoosen River sustain a significant natural resource of the State of Connecticut —the Belding Wild Trout Management Area, one of only two Class I wild trout areas east of the Connecticut River. The importance of these small, high quality watersheds to the downstream health of the larger river basins, and therefore to Long Island Sound, is well recognized. Of utmost importance to these high quality watersheds is protection of the headwaters regions.

The headwaters region of the Tankerhoosen River is bisected by Interstate 84. Recent development pressure in this headwaters region at the Exit 67 interchange in Vernon poses a major threat to the long-term health of the watershed. Further stresses on the headwaters have been created by development of an industrial park in Tolland through which a key headwater stream flows, as well as the presence of the highway itself, which continues to generate increasing traffic loads from development along the I-84 corridor. There has also been declining water quality in the lower reaches of the Tankerhoosen River in recent years. The lower region of the watershed is classified as "B", and was cited as impaired in the DEP's most recent "List of Connecticut Waterbodies Not Meeting Water Quality Standards".



The importance of protecting the pristine upper region of the Tankerhoosen is recognized by both local and state agencies. The 2000-2004 State Plan of Conservation and Development identifies the riverway as a proposed preservation and conservation area. The Vernon Open Space Plan proposes a greenway plan of 2000 preserved acres along the Tankerhoosen. Most recently, the Nature Conservancy has identified several key watersheds in the state that it considers particularly important to the future protection of Long Island Sound, including the Tankerhoosen River watershed. The need for local decision-makers to give utmost consideration to the environmental consequences of development proposals that would impact the River, has been expressed by The Nature Conservancy (TNC) and by the Connecticut Department of Environmental Protection (DEP).

To address these very real and immediate threats, the Friends began a watershed assessment for the Tankerhoosen River in March 2007. The objective of this initial assessment was to describe and understand the overall health, quality and flow of waters within the watershed and to identify potential threats to water quality in the watershed. The assessment included water quality monitoring and natural resource inventories to begin establishing baseline conditions against which future monitoring can be measured. The next step in the watershed planning process is to develop a comprehensive management plan that will provide guidance to local decision-makers and to serve as an educational tool and reference document for those interested in protection of the Tankerhoosen River.

3.0 DEVELOPMENT OF THE BASELINE ASSESSMENT

The initial task in developing a Watershed Management Plan for the Tankerhoosen River is to develop an understanding of baseline, or existing conditions in the watershed. To accomplish this, the following tasks were completed:

- Reviewed existing watershed data, studies, and reports;
- Compiled and analyzed available Geographic Information System (GIS) data for the watershed;
- Consulted with the Technical Advisory Committee, the watershed municipalities, and the regional planning agency regarding available land use information, mapping, and land use planning regulations;
- Identified and delineated subwatersheds within the over Tankerhoosen River watershed; and
- Conducted a comparative subwatershed analysis to prioritize watershed field inventories and management plan recommendations.

The results of this watershed inventory are presented in this document, including a description of current watershed conditions for the following categories:

- Geological and historical perspective;
- Natural resources including hydrology, water quality, wetlands and watercourses, fish and wildlife resources and habitat;
- Watershed modifications including dams, water supply, wastewater discharges, and regulated sites; and
- Land use and land cover.



In addition, the results of a comparative subwatershed analysis are also presented.

4.0 GEOLOGIC AND HISTORICAL PERSPECTIVE

4.1 <u>Geology</u>

The State of Connecticut is comprised of three distinct geologic units divided longitudinally across the state. These three units are known as the Western Uplands, the Central Valley, and the Eastern Uplands. The Western and Eastern Uplands are comprised of metamorphic rocks —rocks subjected to intense heat and pressure of the Earth's interior —while the Central Valley is a younger unit comprised of sedimentary rocks. The Central Valley began forming about 225 million years ago when the super-continent Pangaea began to break apart. A large rift formed a long, narrow valley through the middle of the state, eventually filling with sediments from the eroding hills to the east and west (presently known as the Eastern and Western Uplands). The sediments were compacted into soft, easily eroded, red and brown sandstones through which the Connecticut Rivers flows.

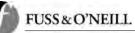
The Tankerhoosen River watershed is almost entirely within the Eastern Uplands. The westernmost portion of the watershed is located within the Central Valley. The boundary between the Central Valley and the Eastern Uplands is located near the Vernon-Manchester town line and known as the Bolton Range. The Bolton Range was formed as a result of the different rates of erosion of the less resistant sediments of the Central Valley creating an abrupt rise into the resistant rocks of the Eastern Uplands.

Drastic changes in the surficial geology have occurred within Connecticut since the formation of these geologic regions. Above the sandstone of the Central Valley and the metamorphic bedrock of the Eastern Uplands lie extensive glacial deposits, or "glacial till," left as the large glaciers receded. Melting glacier ice formed rivers which sorted glacial till into layers of sand and gravel, or "stratified drift." The Tankerhoosen River flows through hills of glacial till in the steep Eastern Uplands and then drops into the stratified drift of the Central Valley (Bell, 1985).

4.2 <u>Population and Industry</u>

Beginning about 10,000 years ago, as the last glacial ice retreated from New England, Native American populations settled Connecticut and the areas along the Tankerhoosen River. The river was used by Native Americans as a source of fish and a travel route to the Connecticut River (Hockanum River Watershed Association, 1998). The Podunks of East Hartford and Manchester, the Nipmucks of Ellington and Tolland were among the tribes that farmed corn in the fertile river floodplains of the Tankerhoosen River. In addition to agriculture, the tribes used the land within the watershed for hunting, gathering, and fishing.

European settlers brought a marked change in land use to Connecticut. Land was cleared and agriculture was the primary use through the Revolutionary War era. However, the availability of more fertile lands in western New York, northern Ohio, and Pennsylvania led to the great migration of Connecticut farmers during the 1800s. Those who stayed worked in the many factories that arose along the rivers and streams, and manufacturing became a major economic force (Gibbons et al., 1992).



The Tankerhoosen River was no exception to the development patterns across Connecticut. From the headwaters at Gages Brook, the elevation drop of the Tankerhoosen River was ideally suited to power a wide variety of mills. During the eighteenth and nineteenth centuries, several mills associated with the textile, cotton-wool, energy, and paper industries were built near these waterfalls and in other areas in the watershed. The Talcottville Historical District is located in southwestern portion of the Tankerhoosen River watershed near the confluence with the Hockanum River. One of the first cotton mills in America was built by Peter Dobson in the early 1800's in Talcottville. The mill burned down in 1909, not to be rebuilt. Peter Dobson is also famous for early observations that ice may have played a role in the erosion and transport of rock in the region.

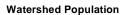
The Vernon Depot, located within the watershed on Church Street, was an active transportation center during the early part of the twentieth century. The Hartford, Providence and Fishkill Railroad ran seven times a day at the Depot, with connections to Rockville. The Keystone Arch on Tunnel Road (also known as the Keystone Tunnel) was constructed circa 1850 to allow trains to traverse Tunnel Road without disrupting street traffic toward Vernon Center. The 108-foot long tunnel is constructed of 30 arches, each of which consists of a center keystone with nine stones forming the curves on either side. The tunnel is considered by historians to be a fine piece of historic architecture and as a monument to the integrity and skilled workmanship of its builders.

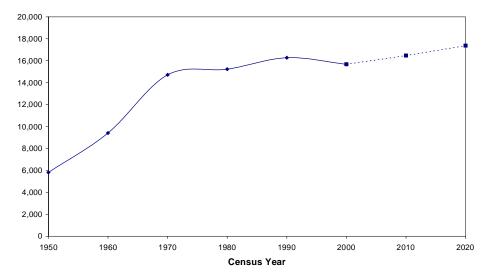
Valley Falls was the site of the first industry in Vernon, a saw mill, in 1740. Valley Falls Park hosted a small mill complex for flaxseed oil and cotton between 1850 and 1877. Beginning in the mid-1800s until the mid-1900s the property was converted into farmland for producing corn, hay, oats, butter, and cheese. In 2001, the historic farmhouse and six outbuildings were purchased by the Friends of Valley Falls, Inc. to ensure preservation of the historical complex. Alternate forms of manufacturing power put most of the mills out of business by the late 1950s. Dozens of the mill buildings and their associated dams remain an integral component of the river.

Rapid population growth in the post-war era of the 1950s and 1960s slowed significantly as developable land became scare (see Figure 4-1). Today, the population of the Tankerhoosen River watershed is approximately 16,000, which is more than double the population of the watershed in the 1950s. Commercial and residential development has occurred in the watershed since the 1970s, with a continued decline in industrial uses. Significant commercial development along the major transportation corridors and residential development in the watershed has increased watershed impervious coverage and contributed to degraded water quality in portions of the Tankerhoosen River and its tributaries. Numerous historical impoundments within the watershed also continue to serve as barriers to fish passage along the Tankerhoosen River and its tributaries.

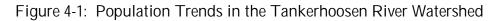
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Source: Connecticut Population Projections, Series 95.1, Office of Policy and Management, September 1995



4.3 <u>Recreation Resources</u>

The Tankerhoosen River provides many opportunities for recreational activities, such as fishing, swimming, and limited boating. Along the river, there are both town and state lands that are preserved for parks, wildlife sanctuaries and rail-trails. Recreational activities in these areas include hiking, biking, cross-country skiing, ice skating, nature observation, and aesthetic enjoyment.

Some of the prominent recreational centers in the watershed include the Walker Reservoir East, the Belding Wildlife Management Area, Valley Falls Park, Bolton Notch Pond, Freja Park, the Rails-to-Trails, and Phoenix Mill Park. Each of these areas provides parking, picnicking, and trails for walking and cross-country skiing. The Belding Wildlife Management Area was the location of the first Class I Trout Management Area in Connecticut. Recreational areas that also have historical significance include the Dobsonville Pond and Talcottville Pond. Additionally, the area associated with the confluence of the Tankerhoosen and Hockanum Rivers includes a privately owned recreational facility and is the starting point for the annual Manchester Canoe and Kayak Race.

4.4 <u>Watershed Restoration Efforts</u>

The Connecticut River Watch Program (CRWP), a volunteer water quality monitoring, protection, and improvement program for the Connecticut River and its tributaries, is working closely with the Hockanum River Watch Program (HRWA) and North Central Conservation District to develop and support a community-based river monitoring and assessment program in the Tankerhoosen River watershed. The CRWP monitoring program has included stream

walk surveys and rapid bioassessments (cost-effective biological survey techniques) along the Tankerhoosen River, as well as other areas of the larger Hockanum River watershed. The Connecticut DEP also conducts routine ambient water quality and benthic monitoring at approximately twelve locations along the Hockanum and Tankerhoosen Rivers. The data assist in documenting the chemical and biological quality of surface waters within the watershed and will be used to support the development of a Total Maximum Daily Load (TMDL), which will address sources of water quality impairment in the Hockanum and Tankerhoosen Rivers.

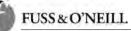
Baystate Environmental Consultants, Inc. (BEC) conducted a feasibility study in 2002 for the dredging of Tankerhoosen Lake and subsequently prepared a Watershed Management Plan for Tankerhoosen Lake in 2004. The plan identified watershed factors that have directly affected or have the potential to affect the water quality and overall health of Tankerhoosen Lake. The project recommended a Town-wide approach for reducing the quantity of pollutants, specifically sediment and nutrients, reaching Tankerhoosen Lake. BEC personnel conducted field observations of the major contributing watercourses and impoundments in the Tankerhoosen Lake watershed to identify point sources of sediment and nutrients as well as nonpoint source pollutants. BEC recommended that the Town of Vernon require the implementation of stormwater best management practices (BMPs) that maximize to the extent practicable, the removal of total suspended solids and nutrients. In addition to the lake dredging project recommended in the feasibility study, BEC also recommended several structural and nonstructural elements, including a sediment trap at the inlet of Tankerhoosen Lake, installation of deep sump catch basins at key locations, maintenance of cross-culverts and drainage structures, and grass swales and vegetated filter strips. None of the BEC recommendations has been implemented to date.

5.0 NATURAL RESOURCES

5.1 <u>Hydrology</u>

The Tankerhoosen River watershed is 12.85 square-miles, with the majority of the watershed (approximately 70 percent) located within the Town of Vernon (Figure 1-1). Gages Brook and its associated southern tributary comprise the headwaters region of the watershed, eventually flowing into Walker Reservoir East. Gages Brook is located in the northwest portion of the Town of Vernon and within the western portion of neighboring Tolland. A few small impoundments are located within the Gages Brook watershed. The brook receives drainage from the I-84 corridor near the Vernon-Tolland town boundary. In Tolland, Gages Brook flows through an industrial park and residential areas.

Walker Reservoir is no longer an active public water supply but rather a recreational resource that attracts hikers, fisherman, and ice skaters. The Tankerhoosen River, which is a moderately sized (16 feet wide) upland stream, originates at the outlet of Walker Reservoir East and bisects the Town of Vernon on the south side of Interstate 84. The river flows southwest for approximately five miles to the Hockanum River in the Talcottville section of Vernon.



Barrows Brook, Rickenback Brook, and several other small tributaries drain the eastern portion of the upper Tankerhoosen River watershed between Walker Reservoir and the confluence with Railroad Brook near Webster Pond. Barrows Brook is the furthest upstream tributary to the Tankerhoosen River and flows through undeveloped, privately owned land. Rickenback Brook flows east to west through a relatively undeveloped portion of Vernon and discharges to the Tankerhoosen River approximately 0.4 miles upstream of the river's confluence with Railroad Brook. Portions of this brook are within the Belding Wildlife Management Area and have been established for catch and release trout fishing (BEC, 2004).

Railroad Brook drains the southern portions of the watershed, beginning at Bolton Notch Pond in Bolton, and flows north through Valley Falls Park and the Belding Wildlife Management Area before joining the Tankerhoosen River. Valley Falls Pond is located along Railroad Brook within the confines of the Valley Falls Park property. Railroad Brook flows through primarily undeveloped land and discharges to the Tankerhoosen River approximately 1.6 miles upstream of Tankerhoosen Lake (BEC, 2004).

Clarks Brook and Tunnel Brook join the Tankerhoosen River in the middle portion of the watershed prior to the river's confluence with the DEP-owned Tankerhoosen Lake, the first of three DEP-owned run-of-river ponds. Clarks Brook originates north of I-84 and drains primarily industrial/commercial and undeveloped land within the Town of Vernon. Clarks Brook discharges to the Tankerhoosen River approximately 0.5 miles upstream of the river's confluence with Tunnel Brook. Tunnel Brook is located in the central portion of Vernon, flowing north to south and crossing the I-84 corridor. The brook empties into the Tankerhoosen River approximately 0.65 miles upstream of the inlet to Tankerhoosen Lake (BEC, 2004).

Dobsonville Pond is located just downstream of Tankerhoosen Lake. Tucker Brook, which drains the southeastern portion of the watershed and a residential section of the Town of Manchester, joins the Tankerhoosen River immediately upstream of Dobsonville Reservoir dam. Further downstream is Talcottville Pond and the confluence with the Hockanum River near the Vernon/Manchester town line.

Overall the Tankerhoosen River is comprised of a large percentage of first and second order (i.e., headwater) streams according to the Strahler Stream Order classification system. Stream hydrology and water quality in headwater streams are important components of ecosystem health because they are a critical food source for the entire river, influence downstream conditions, and support biodiversity.

Ten subwatersheds within the Tankerhoosen River watershed have been delineated for the purposes of this assessment. The subwatershed delineations are based on the CTDEP local basin delineations, modified slightly based on surface water hydrology and grouped accordingly to facilitate assessment and development of watershed management plan recommendations. <u>Figure 5-1</u> depicts the subwatersheds identified in this assessment, and <u>Table 5-1</u> summarizes the basic characteristics of the identified subwatersheds.

Subwatershed	Acronym	Area (acres)	Area (square miles)
Bolton Notch Pond	BNP	344	0.54
Clarks Brook	СВ	647	1.01
Gages Brook	GB	695	1.09
Gages Brook South Tributary	GBST	680	1.06
Lower Tankerhoosen River	LTR	321	0.50
Middle Tankerhoosen River	MTR	1,578	2.46
Railroad Brook	RB	1,208	1.89
Tucker Brook	TB	934	1.46
Upper Tankerhoosen River	UTR	1472	2.30
Walker Reservoir	WR	347	0.54
Tankerhoosen River Watershed		8,226	12.85

Table 5-1: Tankerhooser	n River Subwatersheds

The Tankerhoosen River Watershed is located in an area with a temperate and humid climate. Based on historical climate information available from the NOAA National Weather Service weather station in Harford/Bradley International Airport in Windsor Locks, Connecticut, precipitation is generally well-distributed throughout the year with the wettest conditions in August and November and driest in February (worldclimate.com for Hartford/Bradley International Airport, Hartford County). In Windsor Locks, the mean annual precipitation over a 41-year period of record is 44.4 inches, and the 24-hour average temperature ranges from a high of 73.6°F in July to a low of 24.6°F in January.

Generally, the designated 100-year floodplain of the Tankerhoosen River is confined along a narrow corridor (<500 feet wide) surrounding the river. The entire length of the Tankerhoosen River is within the Federal Emergency Management Agency (FEMA) designated 100-year floodplain, with the exception of a small reach near the river's headwaters, between Reservoir Road and Fish and Game Road. The lower reach of Railroad Brook (below Valley Falls Pond including the pond) is also within the 100-year floodplain. Walker Reservoir West and East and portions of Gages Brook also lie within the designated 100-year floodplain (BEC, 2004).

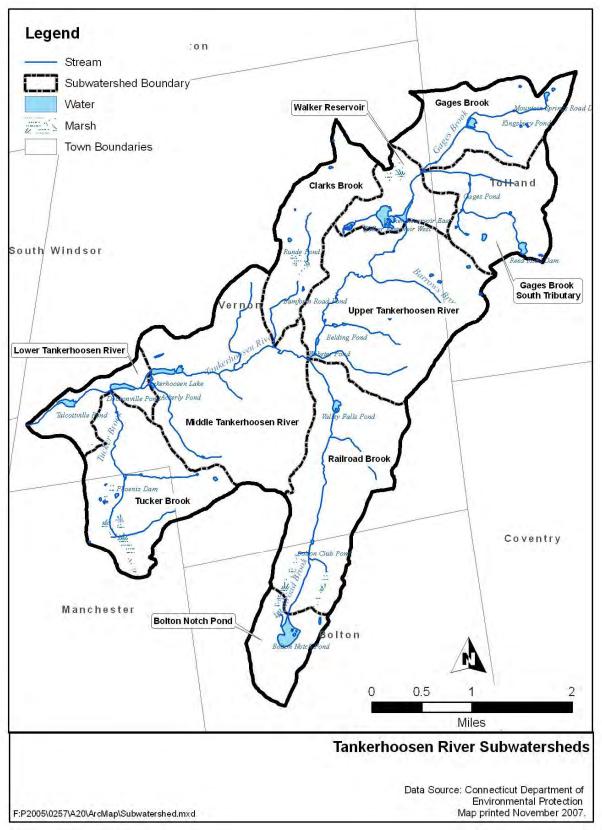


Figure 5-1: Tankerhoosen River Subwatersheds



5.2 <u>Water Quality</u>

5.2.1 Classifications and Impairments

The Federal Clean Water Act (CWA) was developed to protect the nation's surface waters. Through authorization of the CWA, the United States Congress declared as a national goal "water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water wherever attainable". Connecticut Water Quality Standards are established in accordance with Section 22a-426 of the Connecticut General Statutes and Section 303 of the CWA. The Water Quality Standards are used to establish priorities for pollution abatement efforts. Based on the Water Quality Standards, Water Quality Classifications establish designated uses for surface and ground waters and identify the criteria necessary to support these uses. The Water Quality Classification system classifies inland surface waters into four different categories ranging from Class AA to D. <u>Table 5-2</u> summarizes the Connecticut Surface Water Quality Classifications.

Table 5-2: Connecticut	Inland Surface Water Quali	y Classifications
------------------------	----------------------------	-------------------

Designated Use	Class AA	Class A	Class B	Class C	Class D
Existing/proposed drinking water supply	•				
Potential drinking water supply	•	٠			
Fish and wildlife habitat	•	٠	٠	Class C and D waters may be suitable for certain fish and wildli habitat, certain recreational activities, industrial use, and navigation	
Recreational use	•	٠	٠		
Agricultural and industrial use	•	•	•		

Source: DEP Surface Water Quality Standards, December 17, 2002

<u>Figure 5-2</u> depicts the Water Quality Classifications of surface waters in the Tankerhoosen River watershed. Surface waters throughout the Tankerhoosen River watershed are classified as Class A with the exception of the Tankerhoosen Lake, Dobsonville Pond, and Talcottville Pond which are classified as Class B/A.

The CWA (Federal Clean Water Act) requires states to:

- 1. Adopt Water Quality Standards,
- 2. Assess surface waters to evaluate compliance with Water Quality Standards,
- 3. Identify those waters not currently meeting Water Quality Standards, and
- 4. Develop Total Maximum Daily Load (TMDL) analysis and other management plans to bring water bodies into compliance with Water Quality Standards.

A portion of the Tankerhoosen River does not meet Water Quality Standards for at least one of the designated uses. The impaired segment consists of the lower 1.51 miles of the Tankerhoosen River from Tankerhoosen Lakes to its confluence with the Hockanum River. The impaired uses include habitat for fish, other aquatic life, and wildlife. The causes and sources of impairment in the lower reaches of the Tankerhoosen River have not been identified and are currently listed as "unknown." TMDLs provide the framework to restore impaired waters by establishing the maximum amount of a pollutant that a water body can

assimilate without adverse impact to aquatic life, recreation, or other public uses. The 2006 List of Connecticut Waterbodies Not Meeting Water Quality Standards includes a priority ranking system for development of a TMDL specific to the contaminants in each impaired segment: high (H), medium (M), low (L), or under study (T). DEP has identified the impaired segment of the Tankerhoosen River as a high priority for development of a TMDL to restore the impairment. <u>Table 5-3</u> summarizes the location and nature of the impairment.

Location Description	Waterbody Segment Length	Impaired Designated Use	Use Support	Cause	TMDL Priority	Potential Source
From mouth at Hockanum River , upstream to Tankerhoosen Lake	1.51 miles	Habitat for Fish, Other Aquatic Life and Wildlife	Ρ	Impairment Unknown	Н	Source Unknown

	Table 5-3:	Tankerhoosen	River	Watershed	Impaired	Waters
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Source: DEP, 2006

H —high priority for which there is assessment information that suggests that a TMDL may be needed to restore the water quality impairment.

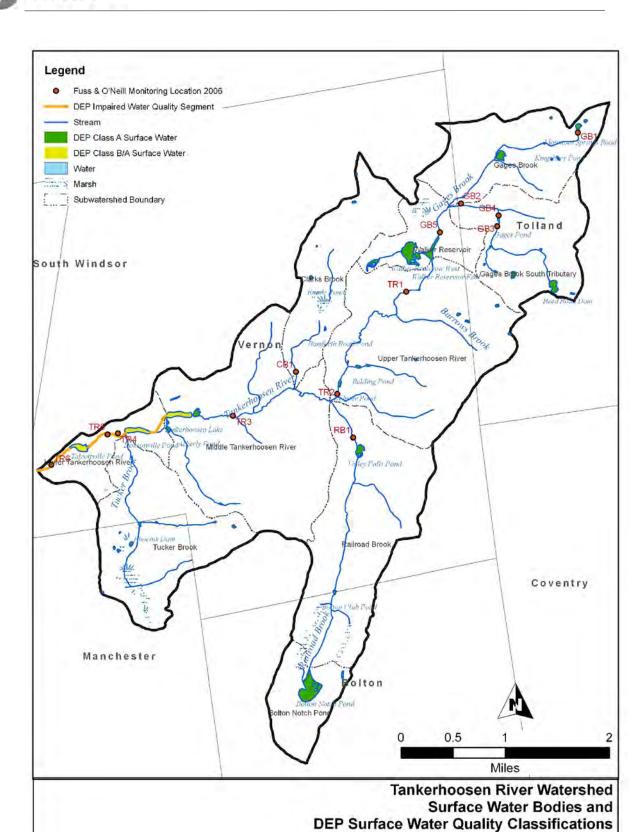
P – partially supporting

5.2.2 Tankerhoosen River Watershed Water Quality Monitoring Study

A water quality monitoring study was conducted in October and November 2006 to establish current baseline water quality conditions in the watershed, identify water quality impacts, and begin to develop a water quality database for the watershed (Fuss & O'Neill, 2007). Chemical water quality monitoring and biological assessments were conducted during dry and wet weather conditions. Samples were collected from fourteen locations throughout the watershed on four occasions (Figure 5-2). A variety of parameters were measured including pH, temperature, dissolved oxygen, and conductivity, which all reported values within normal ranges. These results indicate that the water quality of the watershed is generally good. However, some of the measured parameters including turbidity, metals, nitrogen, phosphorus, and bacteria highlighted some of water quality issues in the watershed. A brief discussion of the water quality parameters and identified issues is provided below:

Turbidity

Based on the wet weather monitoring results, excessive turbidity is a water quality issue in the Tankerhoosen River and its tributaries, particularly Gages Brook (Figure 5-3). Stream channel erosion and stormwater runoff from impervious surfaces and construction sites are potential sources of the observed turbidity during large precipitation events such as the August 2006 wet weather monitoring event, although it is difficult to attribute the turbidity excursions to a particular source. During the August 2006 wet weather monitoring event, turbidity measurements generally exhibited a declining trend from upstream to downstream within the watershed. Elevated levels of indicator bacteria (total coliform and *E. coli*) were measured at all monitoring locations during the October 2006 wet weather monitoring event, suggesting stormwater runoff and other non-point sources (pet waste, waterfowl, septic systems, etc.) as likely contributors of elevated pathogen levels in the Tankerhoosen River and its tributaries.



F:P2005\0257\A20\ArcMap\SurfaceWater.mxd Data Source: Connecticut Department of Environmental Protection Map printed November 2007.

Figure 5-2: DEP Water Quality Classifications

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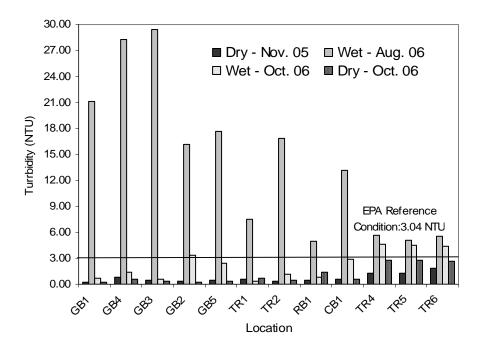


Figure 5-3: Turbidity – Tankerhoosen River Watershed

Metals

The monitoring data suggest a wet weather source of metals to Gages Brook (Figure 5-4 and Figure 5-5). Results from the August 2006 monitoring event indicate a wet weather source of metals close to the I-84 crossing of Gages Brook, as the dissolved copper concentration was consistently below detection limits at the Gages Brook headwaters monitoring location (GB1) and in excess of the chronic aquatic life criterion at several of the downstream Gages Brook locations. The highest wet weather lead concentration was measured in the Gages Brook monitoring location immediately downstream of I-84, which further suggests that highway runoff is a likely source of metals to Gages Brook. Exceedances of the CT WQS for lead were also measured along the Tankerhoosen River at the Fish and Game Road. (TR1) and Bolton Road (TR2) monitoring locations. Elevated dissolved copper and lead concentrations were also measured at the Clarks Brook monitoring location. The data suggest that metals are a potential source of impairment in Gages Brook, Clarks Brook, and the Tankerhoosen River during wet weather. The November 2005 results also indicate dry weather sources of dissolved copper to Gages Brook between the headwaters monitoring location (GB1) and the monitoring location behind the Tolland Agricultural Center (GB2).



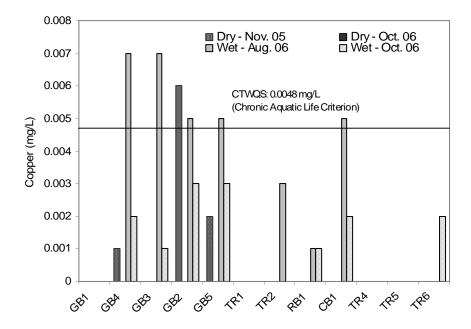


Figure 5-4: Dissolved Copper – Tankerhoosen River Watershed

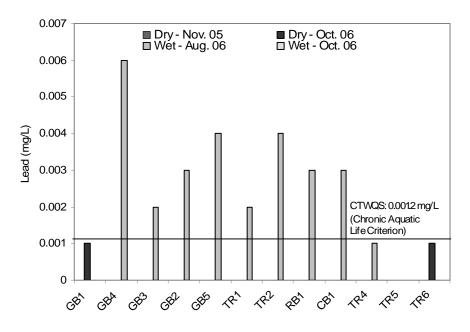


Figure 5-5: Lead – Tankerhoosen River Watershed



Nitrogen & Phosphorus

Many of the monitoring locations exceeded the EPA recommended Total Nitrogen criterion for rivers in Ecoregion XIV of 0.71 mg/L (Figure 5-6). Nitrogen concentrations were consistently higher at the Gages Brook monitoring locations than the other monitoring locations in both wet and dry weather.

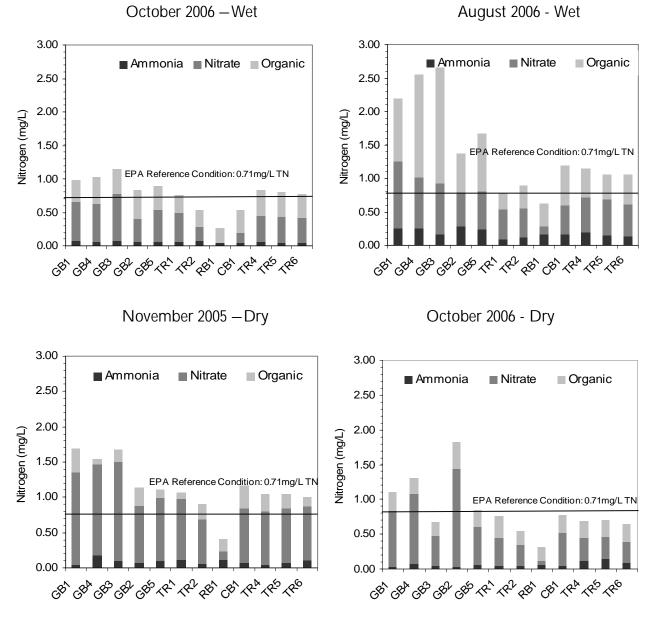


Figure 5-6: Nitrogen Species – Tankerhoosen River Watershed

Phosphorus concentrations measured during the wet and dry weather events significantly exceeded the CT WQS and EPA criterion at most locations (Figure 5-7). The elevated phosphorus levels are an indicator of potential organic enrichment and algal growth in water bodies along the Tankerhoosen River and its tributaries, which could impair aquatic life support and contact recreation under certain conditions.

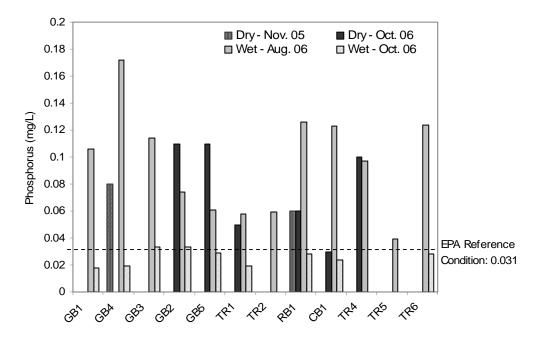


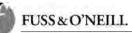
Figure 5-7: Phosphorus – Tankerhoosen River Watershed

Indicator Bacteria

Elevated levels of indicator bacteria (total coliform and *E. coli*) were measured at all monitoring locations during the October 2006 wet weather monitoring event, suggesting stormwater runoff and other non-point sources (pet waste, waterfowl, septic systems, etc.) as likely contributors of elevated pathogen levels in the Tankerhoosen River and its tributaries. Dry weather indicator bacteria concentrations were much lower than wet weather. Natural sources of indicator bacteria such as waterfowl or wildlife may have contributed to several dry weather exceedances of the CT WQS for total coliform at the Gages Brook monitoring location behind the Tolland Agricultural Center and at the Tankerhoosen River monitoring location just upstream of Fish and Game Road.

Bioassessment Results

The 2006 bioassessment data (RBV and Fuss & O'Neill data collectively) vary considerably by site, but generally indicate very good water quality at most of the monitoring locations, with the exception of the lower Tankerhoosen River near the confluence with the Hockanum River and downstream of Dobsonville Pond. This finding is consistent with previous impairments identified in the lower reaches of the Tankerhoosen River by the CTDEP. Despite the water quality issues identified in Gages Brook, Clarks Brook, and in certain reaches of the



Tankerhoosen River (i.e., heavy metals, turbidity and suspended solids, and potential nutrient enrichment), the 2006 bioassessment data indicate little or no impairment to the benthic communities at the monitored locations.

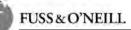
5.3 <u>Wetlands</u>

Generally, wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. Wetlands vary widely because of regional and local differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors, including human disturbance. Wetlands and buffer zones between watercourses and developed areas help to preserve stream water quality by filtering pollutants, encouraging infiltration of stormwater runoff, and protecting against stream bank erosion.

Wetlands in Connecticut are designated by soil classification. <u>Figure 5-8</u> depicts the extent and distribution of wetland soils in the Tankerhoosen River watershed based on Natural Resources Conservation Service soil classifications. <u>Figure 5-8</u> also depicts wetland mapping available from the U.S. Fish & Wildlife Service National Wetlands Inventory. Wetlands soils comprise 11.3% of the overall watershed (approximately 926 acres), while 4% of the watershed area (approximately 320 acres) is mapped as freshwater emergent wetlands or freshwater forested/shrub wetlands. The concentration of wetland soils is generally higher in the undeveloped portions of the watershed. Mapped wetland soils are generally located in riparian and floodplain areas along the Tankerhoosen River and its major tributaries. <u>Table 5-4</u> summarizes wetland soils coverage by subwatershed.

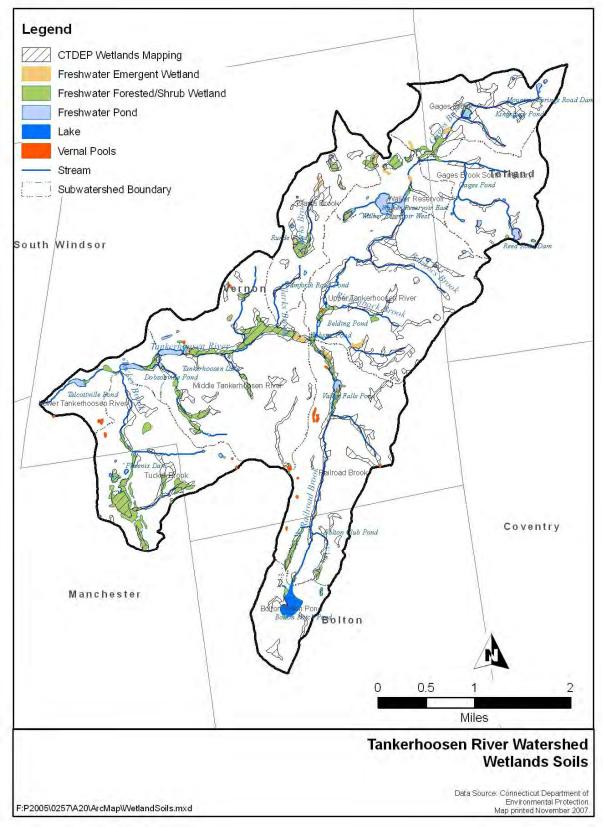
Subwatershed Name	Wetland Soils Area (ac)	% of Subwatershed
Bolton Notch Pond	20	5.8 %
Clarks Brook	101	15.5 %
Gages Brook	111	15.9 %
Gages Brook South Tributary	34	5.1 %
Lower Tankerhoosen River	7	2.3 %
Middle Tankerhoosen River	188	11.9 %
Railroad Brook	136	11.3 %
Tucker Brook	109	11.7 %
Upper Tankerhoosen River	193	13.1 %
Walker Reservoir	27	7.6 %
Tankerhoosen River Watershed	926	11.3%

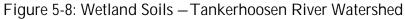
Table 5-4: Wetland Soils Coverage in the Tankerhoosen River Subwatersheds

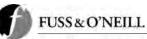


At least twenty vernal pools have been identified within the Tankerhoosen watershed by certified scientists (see <u>Figure 5-8</u>). The majority of these were cited by Mr. Ed Pawluk of Connecticut Ecosystems, LLC in a study conducted for the Vernon Conservation Commission. Several of these pools are considered exemplary vernal pools, and as such merit the highest possible level of protection and conservation (Connecticut Ecosystems, LLC, 2005).

In 1993, a comprehensive survey of plant life was conducted in the 1,400-acre watershed from Valley Falls Park in Vernon to Bolton Notch State Park in Bolton (Sexton, 1993). The study was sponsored by the Town of Bolton Conservation Commission and the Town of Vernon Conservation Commission. A total of 345 species representing 82 families were identified. A small band of marble exists a short distance north and south of the cut at Bolton Notch. A plant species unique to this area includes the Yellow Lady's Slipper. Marble is rare east of the Connecticut River and supports additional plants preferring more basic soil including the purple cliff-brake and maidenhair fern (Sexton, 1993).







5.4 Fish and Wildlife Resources

Portions of the Tankerhoosen River have abundant habitats supportive of a variety of fish and wildlife. Various waterbodies, wetlands, and upland areas provide habitat to fish, mammals, amphibians, and birds.

Particularly notable is the 282-acre Belding Wildlife Management Area located in the central portion of the Tankerhoosen River watershed. The Belding Wildlife Management Area is a significant natural resource of undeveloped land owned by the State of Connecticut and managed by the DEP. A 1.4-mile section of the Tankerhoosen River within the Belding Wildlife Management Area is managed as a Class 1 Wild Trout Management Area and is one of only two such areas in eastern Connecticut. This section of stream is characterized by natural reproduction sufficient to produce robust populations of native brook trout (up to 8-10 inches) and wild brown trout (up to 10-11 inches) exhibiting above average growth rates (DEP correspondence, 2003).

Areas in the Tankerhoosen River watershed that provide significant habitat are summarized in <u>Table 5-5</u>. These areas provide habitat for some of the most valuable or unique natural resources or ecosystems in their respective communities. Other open space areas are described in the Land Use and Land Cover section of this report.

Town	Areas	
Vernon	 Vernal Pools on Box Mountain Tancanhoosen LLC Parcel Talcottville Gorge Belding Wildlife Management Area Belding Wild Trout Management Area Valley Falls Park Rambling Ridge Property Northern Connecticut Land Trust Properties 	
Tolland	Tolland and Charter Marshes	
Bolton	Freja ParkBolton Notch State Park	

 Table 5-5: Areas Providing Habitat for Valuable or Unique Natural Resources

Source: Hockanum River – State of the Watershed Land Use Questionnaire, North Central Conservation District, 2005

Freja Park is a 21-acre, wooded town-owned area located west of Bolton Notch Pond. Freja Park serves as a gateway for the 1,400-acre Bolton Notch/Valley Falls watershed area. The town of Bolton originally acquired the property in 1968, but the park suffered from abuse and neglect. Beginning in March 1998, restoration efforts have been underway including numerous Earth Day Clean-up events with the help of volunteers, Boy Scouts, Conservation Commission members. A total of over two tons of litter have been removed from the park.



5.4.1 Fisheries

The Tankerhoosen River historically hosted large runs of many anadromous fish species. Development of the river with dams from 1700 to the 1920s created barriers to fish migration, which extirpated the salmon run and severely limited the upstream habitat for shad and river herring. Despite these obstacles, the Tankerhoosen River and its tributaries support a variety of fish species as detailed in <u>Table 5-6</u>.

The Tankerhoosen River is a cold water stream starting only a short distance below Walker Reservoir. The generally cold water temperatures in the Tankerhoosen are the result of extensive spring water inputs (DEP correspondence, 2008).

As indicated previously, the Belding Wild Trout Management Area in the upper portions of the Tankerhoosen River watershed is a Class 1 Wild Trout Management Area with self-sustaining native trout populations that rank among the best of their kind in the state. Portions of the remainder of the Tankerhoosen River are stocked annually by the DEP Inland Fisheries Division. Valley Falls Park Pond is stocked in the spring and winter with about 4,400 rainbow trout and generates between 7,500-8,000 angler hours of fishing annually. Walker Reservoir, upstream of the Belding Wildlife Management Area, is stocked each spring with over 1,800 adult brown and rainbow trout (DEP correspondence, 2003).

	Bolton	Gages	Lower	Middle	Upper	Railroad
	Notch Pond	Brook	Tankerhoosen River	Tankerhoosen River	Tankerhoosen River	Brook
American Eel				Х	Х	Х
Brown Bullhead	Х					Х
Black Crappie	Х				Х	
Blacknose Dace		Х		Х	Х	Х
Brook Trout		Х		Х	Х	Х
Brown Trout			Х	Х	Х	Х
Bluegill	Х		Х	Х	Х	Х
Chain Pickerel	Х		Х	Х		
Common Shiner				Х	Х	Х
Creek Chub				Х	Х	
Fallfish				Х	Х	
Fathead Minnow		Х				
Golden Shiner	Х			Х	Х	
Longnose Dace				Х	Х	
Largemouth Bass		Х	Х	Х	Х	Х
Pumpkinseed	Х	Х	х	Х	Х	Х
Sunfish	~	^	~			
Rainbow Trout				Х	Х	Х
Rockbass			Х			
Smallmouth Bass			Х			
Tessellated Darter			Х	Х	Х	
White Sucker		Х		Х	Х	Х
Yellow Perch	Х			Х		Х
Tiger Trout					Stocked in Pond	
Golden Trout					Stocked in Pond	

23

Table 5-6: Fish Species



5.4.2 Birds

Bird surveys were conducted in 2004 at the Tancanhoosen LLC property, within Valley Falls Park, and at various Town of Vernon properties, including areas around Walker Reservoir East and on the Connecticut Light & Power line site.

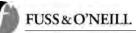
Eighty bird species were detected during the 2004 surveys. Seventy four species were counted during standardized bird counts at 24 count points, and 6 more were detected as incidental observations. The greatest number of species occurred at Walker Reservoir, while the former gravel pit on the Tancanhoosen LLC property contained the most uncommon birds. Prairie warbler, field sparrow, brown thrasher and eastern towhee were detected on the Tancanhoosen LLC property throughout the breeding season. Populations of these species are declining and brown thrasher is on Connecticut's list of Species of Special Concern. These birds are dependent on early successional habitats such as grassland and shrubland. These habitat types have been lost to reforestation and human development. The gravel pit is at an early successional stage with open, grassy habitat and short, scattered pine trees. This site will eventually revert to a forested habitat unless actively managed to maintain early successional habitat. Once the site is reforested, early successional species will disappear from this site (Seymour, 2004).

The Tankerhoosen River watershed also supports a wide range of bird of species. Surveys performed in 2003 and 2004 reported evidence of great blue heron, wood duck, willow flycatcher, hermit thrush, black-throated blue warbler, broad-winged hawk, hairy woodpecker, pileated woodpecker, olive-sided flycatcher, yellow-throated vireo, red-breasted nuthatch, blue-gray gnatcatcher, Nashville warbler, pine warbler, blackpoll warbler, blackburnian warbler, cerulean warbler, worm-eating warbler, and Canada warbler. European starling and house sparrow, two introduced invasive species, were also identified (Seymour, 2004). A complete species list is provided in <u>Appendix A</u>.

During 1999, a bird survey was completed to determine the species diversity and the relative abundance of breeding landbirds within Freja Park and Bolton Notch State Park (Comins, 1999). Of the total 55 species were recorded, 51 were likely nesting species and four were probably non-nesting visitors or migrants. An additional fourteen species were not recorded on the survey, but were identified as likely to occur during the nesting season. Another twenty-nine species have reasonable possibility of occurring in the nesting season from time to time or could be attracted to the area. Two Connecticut State Species of Special Concern were recorded; six species were listed as National Audubon Society Watch List High Conservation Priority species in Connecticut were recorded; an additional six species not listed as watch species were listed by Partners in Flight as High Conservation Priority Species in Connecticut; fourteen species that were uncommon nesters in the Hartford area were recorded (Comins, 1999). See report for additional listing of specific species.

5.4.3 Amphibians & Reptiles

Amphibian and reptile surveys were conducted in 2004 within the Tankerhoosen River watershed, including the Belding Wildlife Management Area, Barrows Brook, and Railroad Brook. Some of the species identified included Northern redback salamander, Northern two-lined salamander, Spotted salamander, American toad, Northern spring peeper, Gray treefrog,



Wood frog, Green frog, Pickerel frog, Painted turtle, and Garter snake. The most abundant amphibian species detected during this study was the northern redback salamander. A complete list of the identified amphibian and reptile species is included as <u>Appendix A</u>. A previously undocumented vernal pool was discovered between Reservoir Road and Walker Reservoir West. Additional vernal pools were identified on Bolton Road and above Valley Falls Park (Seymour, 2004).

5.4.3 Threatened and Endangered Species

The DEP Natural Diversity Data Base (NDDB) maintains information on the location and status of endangered, threatened, and special concern species in Connecticut. Figure 5-9 displays the generalized areas of endangered, threatened, and special concern species in the Tankerhoosen River watershed. The areas represent a buffered zone around known species or community locations. The locations of species and natural community occurrences depicted on the NDDB mapping are based on data collected over the years by the Environmental and Geographic Information Center's Geologic and Natural History Survey, other units of the DEP, conservation groups, and the scientific community. Approximately ten such areas were identified throughout the watershed. Because new information is continually being added to the Natural Diversity Database and existing information updated, the areas are reviewed on an annual basis by the DEP. Areas can be removed or added based upon the results of the review.

Common Name	Scientific Name	Status		
	Flora	1		
Climbing fern	Lygodium palmatum	Special Concern		
Sphagnum	Sphagnum pulchrum			
Beaked sedge	Carex rostrata			
Leatherleaf	Chamaedaphne calyculata			
Fauna				
Eastern pearlshell	Margaritifera margaritifera	Special Concern		
Brown thrasher	Toxostoma rufum	Special Concern		
Southern bog lemming	Synaptomys cooperi	Special Concern		
Wood turtle	Clemmys insculpta	Special Concern		
Purple martin	Progne subis	Threatened		
Eastern box turtle	Terrapene c. carolina	Special Concern		
	Habitats			
Medium fen				
Subacidic rocky summit/outcrop				

Table 5-7: Endangered, Threatened, and Special Concern Species

Source: DEP Natural Diversity Data Base, 2008.

- "Endangered Species" means any native species documented by biological research and inventory to be in danger of extirpation (local extinction) throughout all or a significant portion of its range within Connecticut and to have no more than five occurrences in the state.
- "Threatened Species" means any native species documented by biological research and inventory to be likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range within Connecticut and to have no more than nine occurrences in the state.
- "Species of Special Concern" means any native plant or any native nonharvested wildlife species documented to have a naturally restricted range or habitat in the state, to be at a low population level, to be in such high demand by man that its unregulated taking would be detrimental to the conservation of its population, or has become locally extinct in Connecticut.

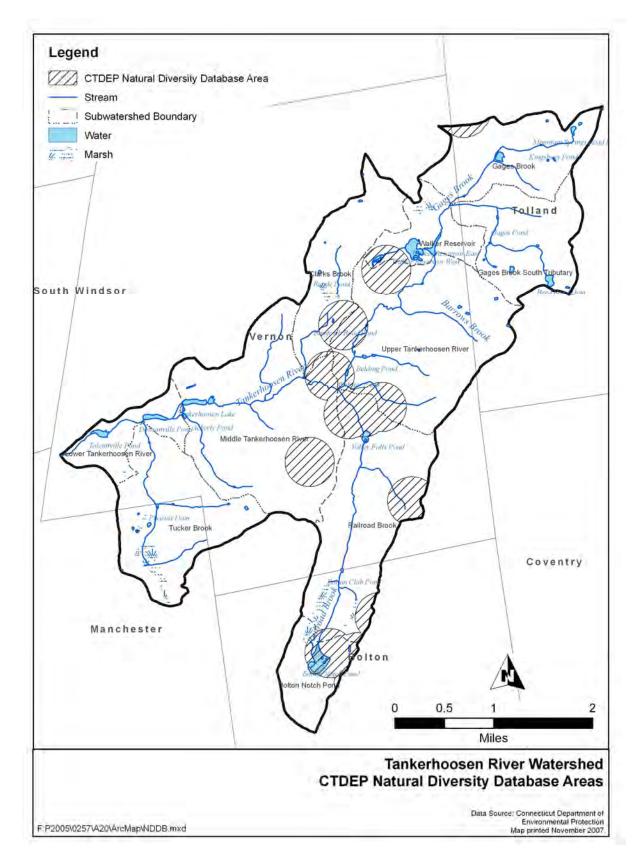
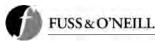


Figure 5-9: CTDEP Natural Diversity Database Areas – Tankerhoosen River Watershed

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6.0 WATERSHED MODIFICATIONS

6.1 Dams, Impoundments, & Water Supply

The historical industrial use of the Tankerhoosen River and its major tributaries has left behind many small dams and impoundments. Most of this infrastructure is no longer used for power generation, and many of these impoundments currently provide aquatic and wildlife habitat and recreational opportunities. Many of the dams in the watershed are also an impediment to fish migration.

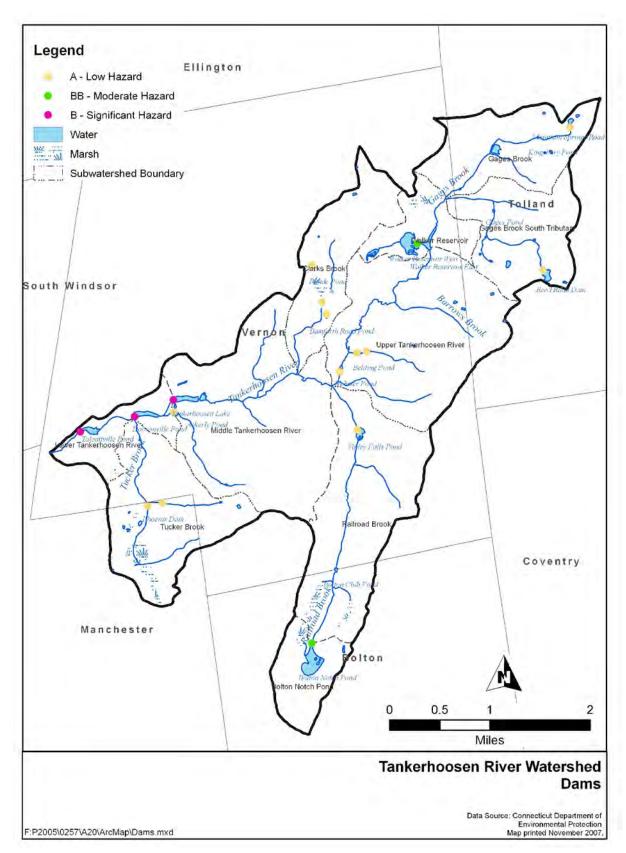
According to the DEP Dam Safety Regulations, the hazard classification of a dam is based on the damage potential from failure of the structure. <u>Figure 6-1</u> shows the location and hazard classification of the identified dams within the watershed. Some of the dams which no longer serve an integral function to industry or public use have fallen into disrepair and pose a potential hazard to downstream properties.

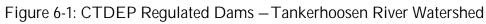
<u>Table 6-1</u> lists the major drinking water supplies within the Tankerhoosen River watershed which are regulated under the DEP Water Diversion program.

Name	Name of Diversion	MGD	Town
	Vernon Well #1	0.1728	Vernon
Connectiout Mater	Vernon Well #2	0.1728	Vernon
Connecticut Water Company	Vernon Well #3	0.1440	Vernon
Company	Vernon Well #4	0.1728	Vernon
	Vernon Well #5	0.4320	Vernon
Manchester Water Department	New Bolton Well Field, Well #1,2,3	Various	Bolton

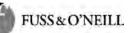
Table 6-1: Major Drinking Water Supplies

The DEP, with Cooperation from the Connecticut Water Company, has identified two preliminary (Level B) Aquifer Protection Areas associated with these wells within the Tankerhoosen River watershed, as shown in <u>Figure 6-2</u>. Aquifer Protection Areas are designated around active well fields in sand and gravel aquifers that serve more than 1,000 people. Level B mapping identifies the general area of aquifer contribution/recharge based primarily on topography. The watershed communities are required to establish land use regulations for these areas to limit potential contamination to public groundwater supplies. Private groundwater supply wells are also prevalent throughout areas of the watershed that are not served by public water supplies.





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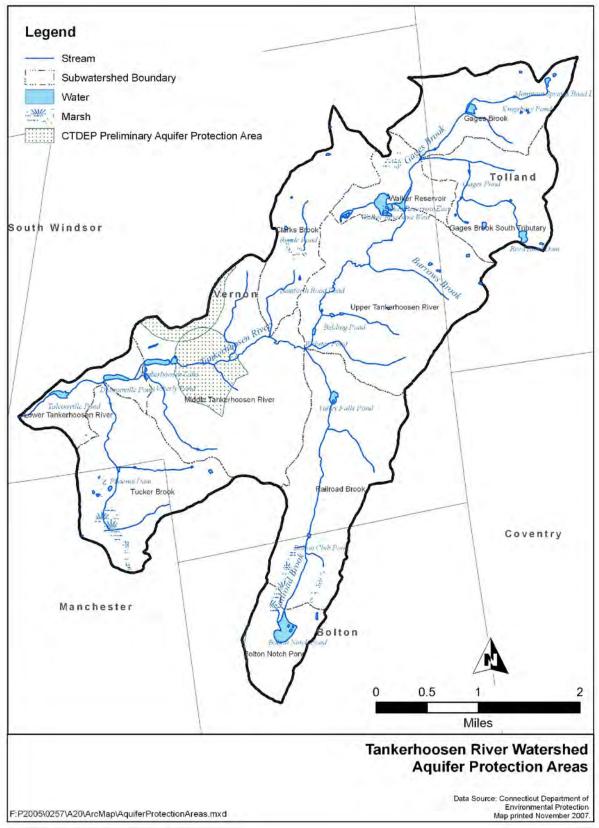
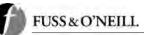


Figure 6-2: CTDEP Aquifer Protection Areas – Tankerhoosen River Watershed



6.2 <u>Wastewater Discharges</u>

As summarized in <u>Table 6-2</u>, there are number of industrial, commercial, and municipal facilities in the Tankerhoosen River Watershed with surface water discharges regulated under the National Pollutant Discharge Elimination System (NPDES) permit program, which is administered by the Connecticut DEP. The facilities listed in <u>Table 6-2</u> have either permitted wastewater or stormwater discharges to surface waters. The majority of these facilities are located in Vernon. There are no municipal wastewater treatment plants located within the Tankerhoosen River watershed.

Town	Facility	Location	Permit Number
Vernon	Carpenter's Mobil	447 Hartford Turnpike	GVS000915
	Company 1 Firehouse	724 Hartford Turnpike	GVM000592
	Connecticut Golfland	95 Hartford Turnpike	GPL000108
	First Student	25 Whitney Ferguson	GSI001217
		Road	
	Motiva Enterprises LLC	444 Hartford Turnpike	GGR001404
	Moore's Automotive	1245 Hartford	GVM000806
		Turnpike	
	Mount Vernon	1120 Hartford	GVS000863
	Apartments	Turnpike	
	Oakland Meadows	1158 Hartford	GSN001098
		Turnpike	
	Tighitco, Inc.	101-77 Industrial Park	GSI001599
		Road	
	Vernon Maintenance	37 Campbell Avenue	GVS000988
			GSI000074
	VMS Construction	120 Bolton Road	GVM000980
	Company		
Bolton	Transportation Facility	326 Boston Turnpike	GSI001179
	Hull's Autobody	299-301 Boston	GVM000800
		Turnpike	
Tolland	Dari Farms	Gerber Drive	GSN000814
	Mr. Sparkle Car Wash	157 Hartford Turnpike	GVM000646
	Connecticut Light &	45 Tolland Stage Road	GVS001027
	Power Co.		
	Gerber Scientific Inc.	24 Industrial Park Road	GSI000914
		West	
	Standard Register Co.	259 Hartford Turnpike	GPP000152
			GPH000345
	CNC Software Inc.	671 Old Post Road	GSN000070
	Belvedere Ridge	601 Old Post Road	GSN001308

Source: DEP December 2007

<u>Figure 6-3</u> depicts sewer service areas in the watershed. Areas outside of the mapped sewer service areas are presumed to be on individual sewage disposal (i.e., septic) systems. Approximately 23% of the overall Tankerhoosen River watershed area is served by municipal sanitary sewers.

6.3 <u>Regulated Sites</u>

Historical and current industrial and commercial development within the Tankerhoosen River watershed poses a potential threat to surface water and groundwater supplies in the watershed. Illegal waste disposal, improper use and disposal of chemicals such as used oil, pesticides, and herbicides, and chemical spills are potential sources of contaminants from industrial and commercial facilities. As summarized in the following table, several hazardous waste generators and other regulated sites are located within the watershed. These facilities are located in both Vernon and Tolland in the central and upper portions of the watershed.

Site Type	Number of sites		
зпе туре	Vernon	Tolland	
Hazardous Waste Generator	5	6	
Air Emissions	1	2	
CERCLA Site	1 (1 on Final NPL)	0	

Table 6-3: Summary of Regulated Sites

Source: epa.gov/region1/superfund/sites/precision, accessed Nov. 2007.

There is one site that is listed as potential hazardous waste site that EPA has evaluated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), otherwise known as "Superfund." This site, Precision Plating Corporation, is located in the Hillside Industrial Park in Vernon and is currently on the Final National Priorities List (NPL). Chromium contaminated groundwater at the site is being remediated under the direction of the DEP.

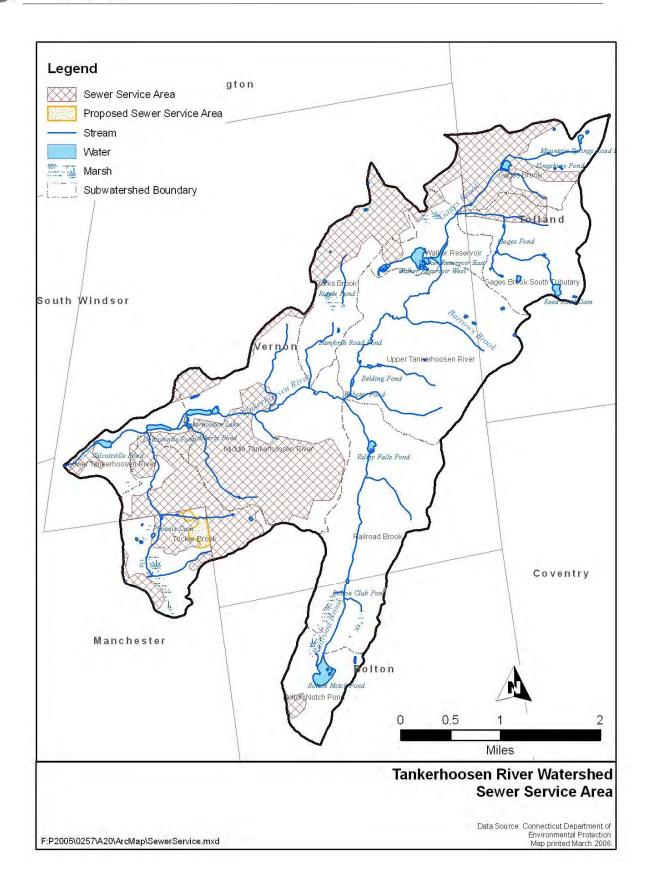


Figure 6-3: Sewer Service Areas – Tankerhoosen River Watershed

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7.0 LAND USE AND LAND COVER

The type and distribution of land use within a watershed have direct impact on nonpoint sources of pollution and water quality. This section describes the land use and land cover patterns in the Tankerhoosen River watershed.

7.1 <u>Current Conditions</u>

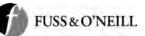
7.1.1 Land Use

<u>Figure 7-1</u> depicts general land use patterns in the Tankerhoosen River watershed. The data in <u>Figure 7-1</u> are parcel-based land use categories for the watershed communities, provided by the Capital Region Council of Governments (CRCOG). The land uses in the watershed include 20 land use categories (<u>Table 7-1</u>). Approximately 60% of the watershed consists of developed land uses, with single-family residential comprising the largest percentage (40%). Highway and other road right-of-ways comprise approximately 9% of the watershed area. Approximately 30% is classified as resource/recreation land use, which includes committed and uncommitted open space. Major portions of the riparian areas adjacent to the Tankerhoosen River and its tributaries are located within resource/recreation areas. Areas in the northern portion of the watershed are more commercialized and have a greater retail and industrial use, with commercial, retail, and industrial land uses comprising approximately 4% of the watershed area. The majority of the commercial, industrial, and retail areas are located in headwater regions adjacent to the major transportation corridors of 1-84/Route 30 and 1-384.

Land Use Type	Acres	Percent of Watershed
Agriculture	103	1 %
One Family	3160	38 %
Two Family	48	<1 %
Three Family	2	<1 %
Multi Family	39	<1 %
Condominium	165	2 %
Group Quarters	12	<1 %
Commercial	110	1 %
Retail	88	1 %
Mixed Use	3	<1 %
Industrial	183	2 %
Government/Non-Profit	102	1 %
School	26	<1 %
Cemetery	22	<1 %
Health/Medical	6	<1 %
Resource/Recreation	2398	29 %
Undeveloped	851	10 %
Right-of-way	770	9 %
Water	77	<1 %
Unknown	61	<1 %

33

Table 7-1: Current Land Use – Tankerhoosen River Watershed



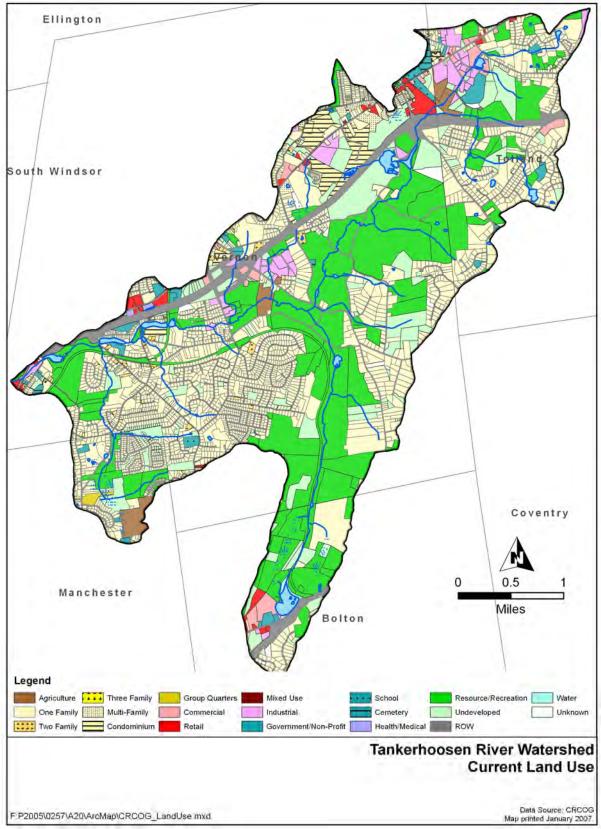
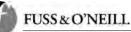


Figure 7-1: Current Land Use – Tankerhoosen River Watershed

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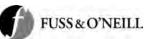


In the Tankerhoosen River watershed, several tracts of potentially developable land have been permanently preserved as "committed" open space. Committed open space parcels in the Town of Vernon and the Town of Bolton were identified through available land use mapping and confirmed by members of the Technical Advisory Committee and the Bolton Conservation Commission. Committed open space parcels in Tolland and Manchester were determined through available mapping from each Town's Plan of Conservation and Development (POCD) and from the Connecticut Office of Policy and Management Municipal Plans of Conservation and Development. In general, the committed open space areas include deeded open space that is privately owned, parcels owned by land trusts, land owned by the State of Connecticut as well as parks owned by the Town of Vernon and Town of Bolton, including the Hop River State Park Trail, Valley Falls Park, Freja Park, and Bolton Notch State Park. This land is protected against future development and is generally located in the central and southern portion of the watershed. <u>Figure 7-2</u> identifies the committed open space land in the watershed.

In addition, several parcels within the watershed are designated for agricultural or forestry use under Public Act 490. While development is not prohibited on this land, this program reduces the tax burden on this land, thereby relieving some of the pressure to develop the land and allows it to continue to serve as open space.

7.1.2 Zoning

<u>Figure 7-3</u> depicts parcel-based zoning designations in the Tankerhoosen River watershed, as provided by CRCOG. The majority of the Tankerhoosen River watershed is zoned for residential uses. Commercial and industrial zones associated with the I-384 and I-84 corridors are located in the southern and northern portions of the watershed, respectively.



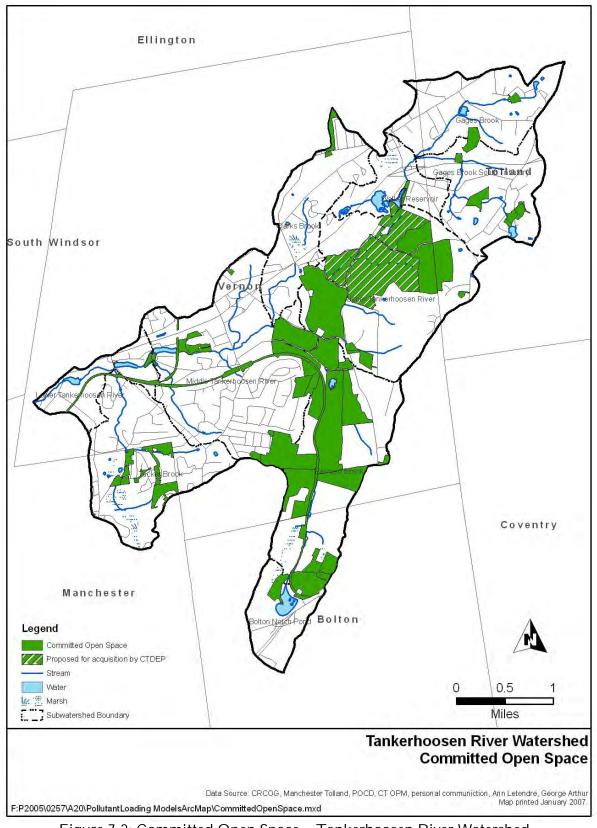


Figure 7-2: Committed Open Space – Tankerhoosen River Watershed

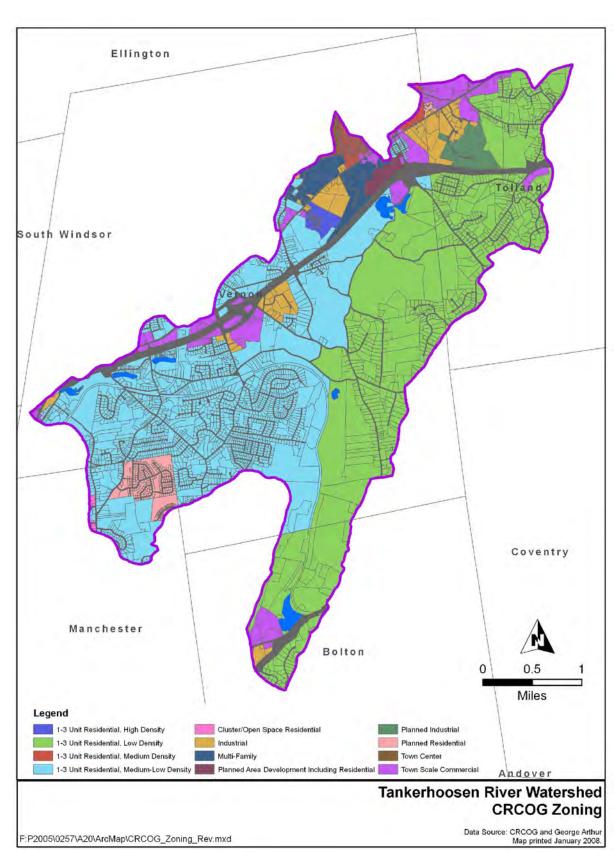


Figure 7-3: Watershed Zoning as Defined by CRCOG – Tankerhoosen River Watershed

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7.1.3 Land Cover

<u>Figure 7-4</u> depicts the general land cover in the Tankerhoosen River watershed. Data shown in <u>Figure 7-4</u> are land cover categories derived from 2002 Landsat satellite imagery with ground resolution of 30 meters. The land cover data in the watershed are summarized into ten categories (<u>Table 7-2</u>). These ten categories are those used in the Connecticut Land Cover Map Series and are described following the table (University of Connecticut Center for Land Use Education and Research).

	1	985	2002		Relative	Relative
Land Cover Type	Acres	Percent of	Acres	Percent of	Percent	Rate of
		Watershed		Watershed	Change ¹	Change ²
Barren	91	1 %	162	2 %	1%	78%
Coniferous Forest	454	6 %	430	5 %	-1%	-5%
Deciduous Forest	4581	56 %	4085	50 %	-6%	-11%
Developed	1793	22 %	2201	27 %	5%	23%
Forested Wetland	192	2 %	175	2 %	0	-9%
Non-forested	2	< 1 %	19	<1 %	0	912%
Wetland						
Other grasses and	551	7 %	603	7 %	0	9%
agriculture						
Turf and grass	448	5 %	447	5 %	0	0%
Utility Right of Way	19	< 1 %	17	<1 %	0	-12%
Water	95	2 %	88	1 %	1%	-7%

¹Calculation = % land cover 2002 - % land cover 1985

²Calculation = (acres land cover 2002 – acres land cover 1985) / acres land cover 1985

	1985		2002		Relative	Relative
Land Cover Type	Acres	Percent	Acres	Percent	Percent	Rate of
		of Basin		of Basin	Change ¹	Change ²
Barren	91	1	162	2	1%	78%
Coniferous Forest	454	6	430	5	-1%	-5%
Deciduous Forest	4581	56	4085	50	-6%	-11%
Developed	1793	22	2201	27	5%	23%
Forested Wetland	192	2	175	2	0	-9%
Non-forested Wetland	2	< 1	19	<1	0	912%
Other grasses and	551	7	603	7	0	9%
agriculture						
Turf and grass	448	5	447	5	0	0%
Utility Right of Way	19	< 1	17	<1	0	-12%
Water	95	2	88	1	1%	-7%

¹Calculation = % land cover 2002 - % land cover 1985

²Calculation = (acres land cover 2002 – acres land cover 1985) / acres land cover 1985

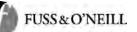
Source: University of Connecticut's Center for Land Use Education and Research (CLEAR)

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- Barren Mostly non-agricultural areas free from vegetation, such as sand, sand and gravel operations, bare exposed rock, mines, and quarries. Also includes some urban areas where the composition of construction materials spectrally resembles more natural materials. Also includes some bare soil agricultural fields.
- Coniferous Forest Includes Southern New England mixed softwood forests. May include isolated low density residential areas.
- Deciduous Forest Includes Southern New England mixed hardwood forests. Also includes scrub areas characterized by patches of dense woody vegetation. May include isolated low density residential areas.
- Developed High density built-up areas typically associated with commercial, industrial and residential activities and transportation routes. These areas contain a significant amount of impervious surfaces, roofs, roads, and other concrete and asphalt surfaces.
- Forested Wetland Includes areas depicted as wetland, but with forested cover. Also includes some small watercourses due to spectral characteristics of mixed pixels that include both water and vegetation.
- Non-forested Wetland Includes areas that predominantly are wet throughout most of the year and that have a detectable vegetative cover (therefore not open water). Also includes some small watercourses due to spectral characteristics of mixed pixels that include both water and vegetation.
- Other Grasses and Agriculture Includes non-maintained grassy areas commonly found along transportation routes and other developed areas and also agricultural fields used for both crop production and pasture.
- Turf & Grass A compound category of undifferentiated maintained grasses associated mostly with developed areas. This class contains cultivated lawns typical of residential neighborhoods, parks, cemeteries, golf courses, turf farms, and other maintained grassy areas. Also includes some agricultural fields due to similar spectral reflectance properties.
- Utility Includes utility rights-of-way. This category was manually digitized on-screen from rights-of-way visible in the Landsat satellite imagery. The class was digitized within the deciduous and coniferous categories only.
- Water Open water bodies and watercourses with relatively deep water.

Forest Cover

Forested areas are the predominant land cover type in the Tankerhoosen River watershed. Approximately 55% of the watershed consists of deciduous and coniferous forests, primarily in the central and southern portions of the watershed. <u>Table 7-3</u> compares the total acres and percent forest cover by subwatershed. The percent forest cover in each subwatershed ranges from approximately 31% in the Walker Reservoir subwatershed to approximately 86% in the Railroad Brook subwatershed. Based on a literature threshold values documented in several studies (CLEAR, 2007), watershed forest cover of 65% or greater is the minimum needed for a healthy aquatic invertebrate community. Only two of the ten subwatersheds, Railroad Brook and the Upper Tankerhoosen River, exceed the threshold value of 65%. Based on a recommendation of the American Forests organization, 40% forest cover is a reasonable threshold goal for urban areas. All but two subwatersheds, Clarks Brook (34.8 %) and Walker Reservoir (31.3 %), both of which are located in the northern and most developed portion of the watershed, meet this goal.



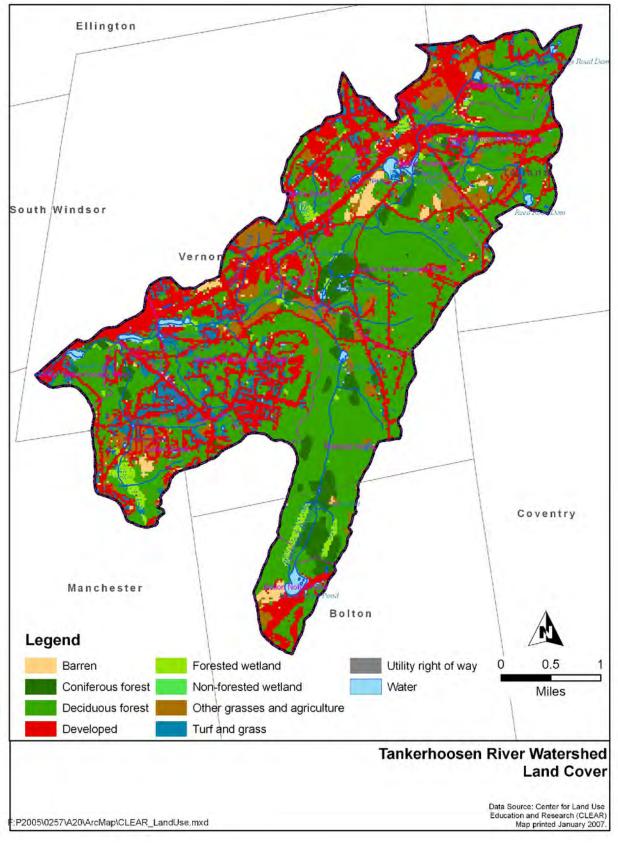


Figure 7-4: Land Cover – Tankerhoosen River Watershed

Subwatershed Name	Forest Cover in Subwatershed (acres)	Percent Forest Cover in each Subwatershed	Developable Forest Cover in Subwatershed (acres)	Percent of Forest Cover that is Developable
Bolton Notch Pond	171	49.6 %	41	24.0 %
Clarks Brook	226	34.8 %	70	30.9 %
Gages Brook	314	45.2 %	134	42.6 %
Gages Brook South Tributary	395	58.1 %	171	43.3 %
Lower Tankerhoosen River	149	46.6 %	82	54.9 %
Middle Tankerhoosen River	625	39.6 %	122	19.6 %
Railroad Brook	1043	86.3 %	346	33.2 %
Tucker Brook	374	40.0 %	119	31.8 %
Upper Tankerhoosen River	1110	75.4 %	278	25.0 %
Walker Reservoir	109	31.3 %	54	49.2 %
Tankerhoosen River Watershed	4515	54.9 %	1416	31.4 %

<u>Table 7-3</u> also includes a comparison of the amount of forest cover in each subwatershed that could potentially be developed in the future (i.e., "developable"). Refer to Section 7.2.1 for a discussion of the determination of "developable" areas and watershed buildout scenario. The percent of forest cover that is developable for each subwatershed ranges from approximately 20% in the Middle Tankerhoosen River subwatershed and up to approximately 55% in the Lower Tankerhoosen River subwatershed. These results suggest that future development within the watershed has the potential to significantly reduce forest cover and, in some subwatersheds, to below recommended thresholds.

Riparian Vegetation

Riparian, or streamside, corridors are critical areas important to stream stability, pollutant removal, and wildlife habitat. These areas are also sometimes called "buffer" areas, but are not to be confused with regulatory review zones, which are often also called buffers (CLEAR 2007). A stream walk survey of the Tankerhoosen River conducted in 1999 revealed that riparian buffers of 100 feet are common between the river and developed areas. However, some areas along the lower reaches of the Tankerhoosen River were identified as having stream buffers of less than 25 feet, according to the results of a 2000 stream walk survey of the Tankerhoosen River.

In order to assess the status and of the riparian corridors in the Tankerhoosen River watershed, the acreage of forest cover within the riparian area (defined as a 200-foot buffer on both sides of streams and a 200-foot buffer from waterbody shorelines) was calculated for each of the ten subwatersheds based on the 2002 Center for Land Use Education and Research (CLEAR) forest land cover classes (coniferous and deciduous forest). The results are provided in

Table 7-4.

	Forest Cover in 200-	Percent of 200-foot
Subwatershed Name	foot Riparian Corridor	Riparian Corridor that is
	(acres)	Forested
Bolton Notch Pond	19	34.9 %
Clarks Brook	42	46.3 %
Gages Brook	85	61.4 %
Gages Brook South Tributary	93	62.3 %
Lower Tankerhoosen River	31	35.8 %
Middle Tankerhoosen River	99	41.8 %
Railroad Brook	167	87.2 %
Tucker Brook	92	51.8 %
Upper Tankerhoosen River	216	80.7 %
Walker Reservoir	21	23.1 %
Tankerhoosen River Watershed	866	58.3%

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Table 7-4: Forest	Cover in Riparian	Areas in the	Tankerhoosen	River Subwatersheds
			1 drift control could in a	

Forest cover within the 200-foot riparian corridor for the overall Tankerhoosen River Watershed is nearly 60%, although the amounts vary considerably by subwatershed. Railroad Brook (87.2%) and the Upper Tankerhoosen River (80.7%) subwatersheds have the highest percentage of forest cover within the 200-foot riparian corridor. Walker Reservoir (23.1%) and Bolton Notch Pond (34.9%) have the lowest percentage of forest cover within the 200-foot riparian corridor. These results indicate that large portions of the watershed streams and waterbodies are well-protected by intact riparian forest cover, although several subwatersheds have significantly lower riparian forest cover.

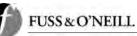
Developed Areas

Developed areas are also a dominant land cover type in the Tankerhoosen River watershed. Approximately 27% of the watershed consists of commercial, industrial, residential, and transportation land cover types (i.e. "developed" category) that follow the major transportation corridors, regional retail and commercial areas, and population centers. Approximately 7% of the watershed consists of other grass and agriculture, although only a small portion of this (approximately 1%) consists of land in active agricultural use.

A comparison of watershed land cover data between 1985 and 2002 (<u>Table 7-2</u>) shows a moderate increase in watershed development during this period (5% increase in developed cover types) and a corresponding loss of coniferous (1% decrease) and deciduous forest (6% decrease).

7.1.4 Impervious Cover

Impervious cover has emerged as a measurable, integrating concept used to assess the overall condition of a watershed. Numerous studies have documented the cumulative effects of urbanization on stream and watershed ecology (Center for Watershed Protection, 2003; Schueler et al., 1992; Schueler, 1994; Schueler, 1995; Booth and Reinelt, 1993, Arnold and Gibbons, 1996; Brant, 1999; Shaver and Maxted, 1996). Research has also demonstrated similar



effects of urbanization and watershed impervious cover on downstream receiving waters such as lakes, reservoirs, estuaries, and coastal areas.

The correlation between watershed impervious cover and stream indicators is due to the relationship between impervious cover and stormwater runoff, since streams and receiving water bodies are directly influenced by stormwater quantity and quality. Although well-defined imperviousness thresholds are difficult to recommend, research has generally shown that when impervious cover in a watershed reaches between 10 and 25 percent, ecological stress becomes clearly apparent. Between 25 and 60 percent, stream stability is reduced, habitat is lost, water quality becomes degraded, and biological diversity decreases (NRDC, 1999). Watershed imperviousness in excess of 60 percent is generally indicative of watersheds with significant urban drainage. <u>Figure 7-5</u> illustrates this effect. These research findings have been integrated into a general watershed planning model known as the impervious cover model (ICM) (CWP, 2003). The ICM has also been confirmed locally in Connecticut by the CTDEP, which has determined a statewide impervious cover threshold of 12 percent for aquatic life impairment (Belucci, CTDEP, 2007).

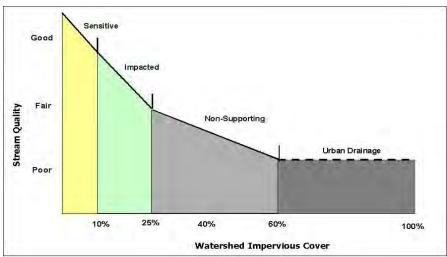


Figure 7-5: Relationship Between Watershed Imperviousness and Stream Health Source: www.cwp.org

A GIS-based impervious cover analysis was performed for the Hockanum River watershed and including the Tankerhoosen River watershed by staff from the Department of Natural Resources Management and Engineering at the University of Connecticut (Civco, 2005). The satellite-derived land cover data described previously were used in the analysis. This technique, known as "direct impervious surface modeling", extracted impervious surface data directly from 2002 Landsat imagery to estimate the amount of impervious surface within each pixel. The DEP GIS basin layer was used to calculate the percent of imperviousness by basin. Figure 7-5 graphically summarizes the results of this analysis.

The overall imperviousness of the Tankerhoosen River watershed is estimated at approximately 9.7% (<u>Table 7-5</u>). This level of impervious cover is slightly below the CTDEP aquatic life impairment threshold of approximately 12%, where ecological stress and stream impacts become apparent. As shown in <u>Figure 7-6</u>, impervious cover in much of the central and southern portions of the watershed (Upper Tankerhoosen River and Railroad Brook

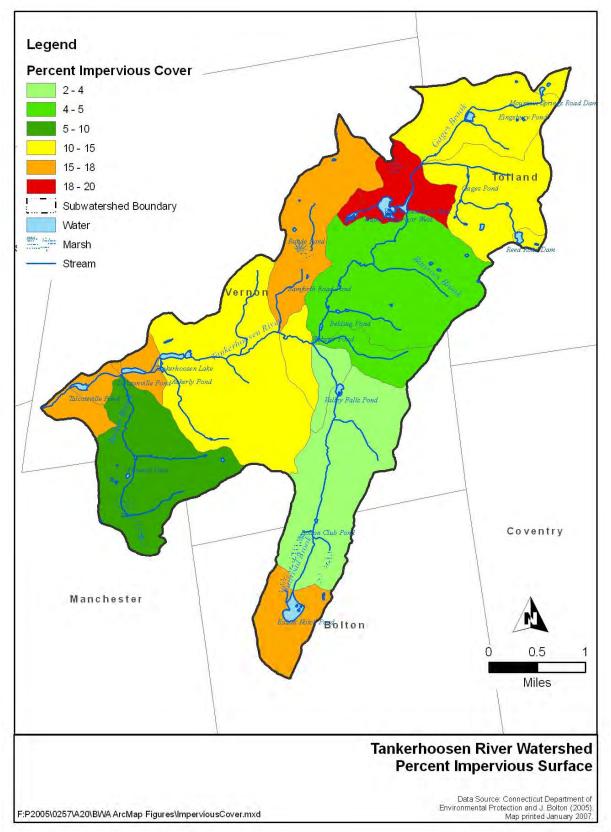
watersheds) is less than 5%, consistent with the high percentage of forest cover and conservation land in these areas. The headwater tributaries of the Tankerhoosen River, specifically Gages Brook, are estimated to have approximately 11.5% impervious cover, while localized subwatershed areas around Bolton Notch Pond, Walker Reservoir, and Dobsonville Pond have impervious cover near or above 20%.

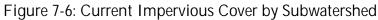
Subwatershed	Percent Impervious Cover
Bolton Notch Pond	16.6 %
Clarks Brook	17.2 %
Gages Brook	11.5 %
Gages Brook South Tributary	11.3 %
Lower Tankerhoosen River	15.8 %
Middle Tankerhoosen River	12.9 %
Railroad Brook	1.7 %
Tucker Brook	8.1 %
Upper Tankerhoosen River	4.5 %
Walker Reservoir	19.9 %
Total	9.7 %

Table 7-5: Percent Impervious Cover – Tankerhoosen Watershed

The results of this analysis provide an initial diagnosis of potential stream and receiving water quality within the watershed study area. The analysis method and ICM are based on several assumptions and caveats, which limits its application to screening-level evaluations. Some of the assumptions of the ICM include:

- Requires accurate estimates of percent impervious cover, which is defined as the total amount of impervious cover over a subwatershed area. The resolution of the land cover data used in the evaluation is relatively coarse, although sufficient for screening analysis.
- Predicts potential rather than actual stream quality.
- Does not predict the precise score of an individual stream quality indicator but rather predicts the average behavior of a group of indicators over a range of impervious cover.
- The 10 and 25 % thresholds are approximate transitions rather than sharp breakpoints.
- The ICM has not been validated for lakes, reservoirs, aquifers, and estuaries.
- Does not currently predict the impact of watershed best management practices (treatment or non-structural controls).
- Does not consider the geographic distribution of the impervious cover relative to the streams and receiving waters. Effective impervious cover (impervious cover that is hydraulically connected to the drainage system) has been recommended as a better metric, although determining effective impervious cover requires extensive and often subjective judgment as to whether it is connected or not.
- Impervious cover is a more robust and reliable indicator of overall stream quality beyond the 10 percent threshold. The influence of impervious cover on stream quality is relatively weak compared to other potential watershed factors such as percent forest cover, riparian community, historical land use, soils, agriculture, etc. for impervious cover less than 10 percent.





7.2 <u>Future Conditions</u>

A watershed buildout analysis was also conducted as part of this assessment to assist in the identification of subwatersheds with the highest restoration potential as well as the greatest vulnerability. The purpose of the analysis is to estimate the future land use and impervious cover conditions of the watershed as a result of maximum development allowed by the current zoning within the watershed.

7.2.1 Land Use

Watershed lands that could be developed in the future (i.e., "developable" land) were subdivided into two categories, based on the CRCOG parcel-based land use data:

- <u>New Development</u> areas that are currently undeveloped and could become new developments in the future. Land designated as "new development" includes those parcels that are designated as "undeveloped" and "resource/recreation" in the CROCG land use data and not identified as committed open space.
- <u>Redevelopment</u> areas that are currently underdeveloped and could be redeveloped with a higher intensity land use in the future. Land designated for "redevelopment" were limited to single-family residential parcels in the CRCOG land use data that could be subdivided and/or redeveloped in the future.

Areas having the following physical and/or regulatory constraints were also removed from consideration for future development or redevelopment: water bodies, wetland soils, and soils whose slope characteristics defined by NRCS exceed 15% (i.e., steep slope soils). Resulting fragments of land smaller than ¼-acre in size for new development and 3 acres in size for redevelopment were also removed from the analysis. <u>Table 7-6</u> and <u>Figure 7-7</u> summarize the amount of developable land by subwatershed, including the new development and redevelopment categories.

Subwatershed	New Development (acres)	New Development Percent in Subwatershed	Redevelopment (acres)	Redevelopment Percent in Subwatershed
Bolton Notch Pond	49	14.3 %	11	3.2 %
Clarks Brook	57	8.8 %	52	8.1 %
Gages Brook	129	18.5 %	72	10.3 %
Gages Brook South Tributary	123	18.1 %	102	15.0 %
Lower Tankerhoosen River	91	28.5 %	17	5.4 %
Middle Tankerhoosen River	127	8.0 %	141	8.9 %
Railroad Brook	212	17.6 %	172	14.3 %
Tucker Brook	122	13.1 %	89	9.5 %
Upper Tankerhoosen River	238	16.1 %	150	10.2 %
Walker Reservoir	108	31.3 %	13	3.8 %
Total	1257	15.3 %	820	10.0 %

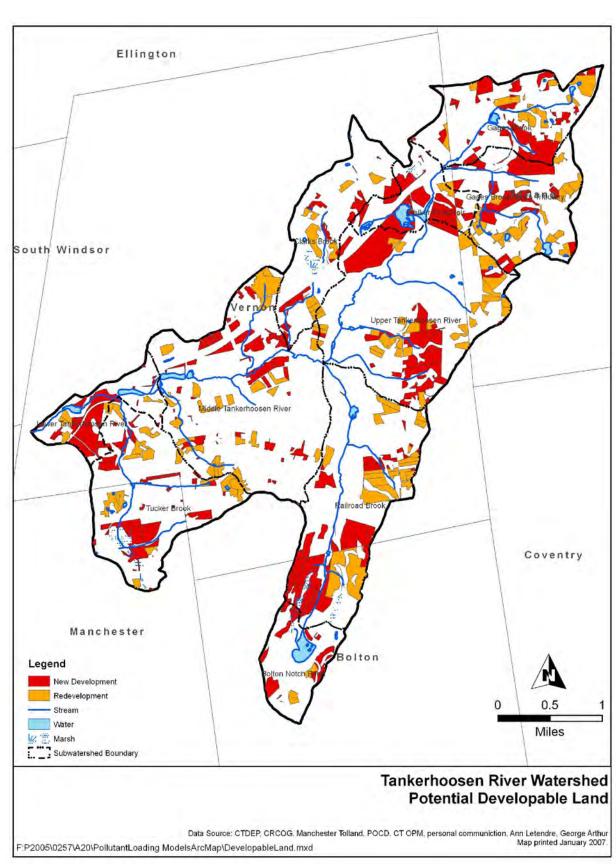


Figure 7-7: Developable Land – Tankerhoosen River Watershed

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The future land use buildout scenario was estimated by assigning new land uses to developable areas (See <u>Section 7.2.1</u>), while maintaining the existing land uses for developed and unbuildable land (wetland soils, steep slope soils, etc.). The developable areas were assigned a future land use based on maximum degree of development allowed by the existing zoning category. <u>Table 7-7</u> presents the future land use category assigned to each developable parcel based on the zoning category. This analysis assumes development of Act 490 parcels consistent with the underlying zoning and does not account for future zone changes or future land development regulatory changes.

Zoning Category	Assigned Future Land Use
1-3 Unit Residential, High Density	Condominium
1-3 Unit Residential, Medium Density	Three Family
1-3 Unit Residential, Medium-Low Density	Two Family
1-3 Unit Residential, Low Density	One Family
Cluster/Open Space Residential	One-Family
Industrial	Industrial
Multi-Family	Multi-Family
Planned Area Development Including Residential	Mixed Use
Planned Industrial	Industrial
Planned Residential	Multi-Family
Town Center	Mixed Use
Town Scale Commercial	Commercial

Table 7-7: Assigned Future Land Use Category

The results of the buildout analysis are summarized in <u>Table 7-8</u>, which compares acreage of existing and future land use in the watershed. The most significant potential land use change is in the residential land use categories, which is predicted to increase by approximately 15% watershed-wide. The area of resource/recreation and undeveloped land is predicted to decrease by approximately 15% watershed-wide, while commercial and industrial land are predicted to increase by approximately 3%.

Table 7-8: Existing and Future Land Use – Tankerhoosen Watershed

Land Use Type	AcresExisting	Percent of Basin _{Existing}	Acres _{Future}	Percent of Basin _{Future}	Relative Percent Change
Agriculture	103	1 %	89	1 %	0
One Family	3160	38 %	3415	42 %	4%
Two Family	48	<1 %	811	10 %	10%
Three Family	2	<1 %	3	<1 %	0
Multi Family	39	<1 %	60	1 %	1%
Condominium	165	2 %	177	2 %	0
Group Quarters	12	<1 %	12	<1 %	0
Commercial	110	1 %	206	3 %	2%
Retail	88	1 %	88	1 %	0
Mixed Use	3	<1 %	33	<1 %	0
Industrial	183	2 %	270	3 %	1%

Land Use Type	Acresexisting	Percent of Basin _{Existing}	Acres _{Future}	Percent of Basin _{Future}	Relative Percent Change
Government/Non-Profit	102	1 %	102	1 %	0
School	26	<1 %	26	<1 %	0
Cemetery	22	<1 %	14	<1 %	0
Health/Medical	6	<1 %	6	<1 %	0
Resource/Recreation	2398	29 %	1787	22 %	-7%
Undeveloped	851	10 %	233	3 %	-7%
Right-of-way	770	9%	770	9 %	0
Water	77	<1 %	77	<1 %	0
Unknown	61	<1 %	46	<1 %	0

7.2.2 Impervious Cover

The watershed buildout analysis was used in conjunction with the existing conditions impervious cover analysis (Section 7.1.3) to estimate future impervious cover in the Tankerhoosen River subwatersheds. To complete this analysis, impervious cover was included as a parameter in the pollutant load model described in Section 8.1. Each urban land use type was assigned an impervious cover coefficient based on literature values (see Table 2 in Appendix B). Land use data for both existing and buildout conditions were then entered into the model to determine the change in impervious cover for each subwatershed. The predicted change in impervious cover was then added to the existing impervious cover estimates described in Section 7.1.3 to estimate future impervious cover.

<u>Table 7-9</u> presents estimates of existing and future impervious cover (<u>Figure 7-8</u>) by subwatershed. The shaded cells in the table highlight the subwatersheds in which future impervious cover is predicted to approach or exceed either the "sensitive" (10% to 12%) or "impacted" (25%) threshold values as described by the Impervious Cover Model.

Subwatershed	Existing Percent Impervious Cover	Future Percent Impervious Cover	Percent Change (ICFuture – ICExisting)
Bolton Notch Pond	16.6 %	18.9 %	2.3 %
Clarks Brook	17.2 %	20.6 %	3.4 %
Gages Brook	11.5 %	14.2 %	2.7 %
Gages Brook South Tributary	11.3 %	13.5 %	2.2 %
Lower Tankerhoosen River	15.8 %	23.0 %	7.2 %
Middle Tankerhoosen River	12.9 %	15.5 %	2.6 %
Railroad Brook	1.7 %	3.4 %	1.7 %
Tucker Brook	8.1 %	10.3 %	2.2 %
Upper Tankerhoosen River	4.5 %	4.7 %	0.2 %
Walker Reservoir	19.9 %	29.13 %	9.2 %
Total	9.87 %	12.47 %	2.6 %

Table 7-9: Percent Impervious Cover – Existing and Future Conditions

It is significant to note that, based on this analysis, the overall impervious cover in the Tankerhoosen River watershed is predicted to increase from less than 10% to greater than

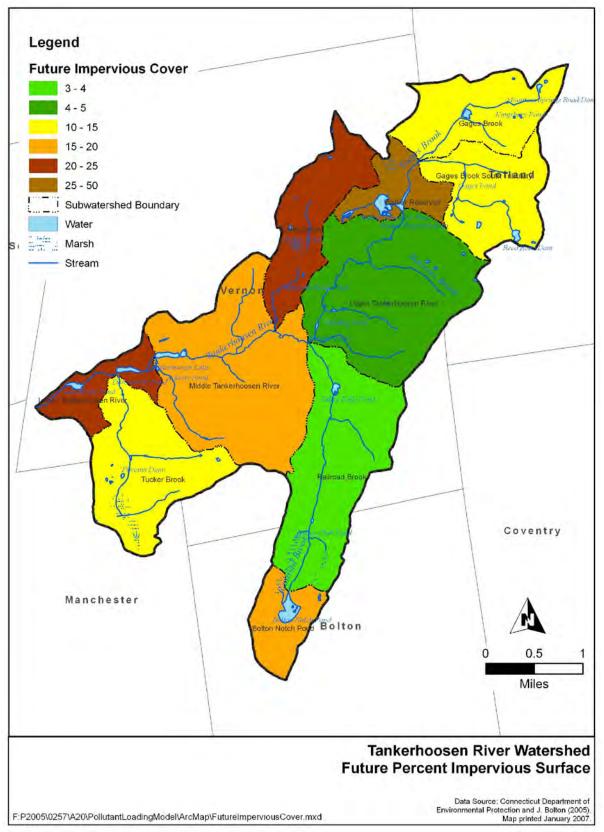
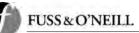


Figure 7-8: Future Impervious Cover – Tankerhoosen River Watershed



12%, which is considered impacted (see <u>Figure 7-5</u>). The largest change in impervious cover is predicted in the Walker Reservoir subwatershed, where imperviousness could increase from approximately 20%, or "impacted," to approximately 29%, or "non-supporting." Additionally, the impervious cover in Gages Brook and the associated Gages Brook South Tributary subwatersheds, both of which are important headwater streams, is predicted to cross the statewide 12% sensitive threshold value.

Another useful metric was developed by Goetz et al. (2003) for the Chesapeake Bay region, which combines subwatershed impervious cover and tree cover within the 100-foot stream buffer. Each of the subwatersheds within the Tankerhoosen River Basin was analyzed with regard to the combined impervious cover/riparian zone metric, which is summarized in the following matrix by Goetz et al. (2003).

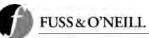
Stream Health	% Watershed Impervious Cover	% Natural Vegetation in 100-ft Stream Buffer
Excellent	< = 6%	>=65%
Good	6-10%	60-65%
Fair	10-25%	40-60%
Poor	> 25%	<40%

Natural vegetation was determined using the CLEAR land cover data and included the deciduous forest, coniferous forest, forested wetland, and non-forested wetland categories. The following table presents the results from the combined impervious cover/riparian zone metric.

Table 7-10: Impervious Cover/Riparian Zone Metric – Existing and Future Conditions

	Exis	ting	Fut	ure
Subwatershed	% Watershed Impervious Cover	% Natural Vegetation in 100-ft Stream Buffer	% Watershed Impervious Cover	% Natural Vegetation in 100-ft Stream Buffer
Bolton Notch Pond	16.6 %	40.4 %	18.9 %	39.8 %
Clarks Brook	17.2 %	51.9 %	20.6 %	38.0 %
Gages Brook	11.5 %	59.5 %	14.2 %	50.1 %
Gages Brook South Tributary	11.3 %	69.6%	13.5 %	40.2 %
Lower Tankerhoosen River	15.8 %	42.7 %	23.0 %	26.0 %
Middle Tankerhoosen River	12.9 %	49.7 %	15.5 %	41.8 %
Railroad Brook	1.7 %	89.4 %	3.4 %	73.7 %
Tucker Brook	8.1 %	65.5 %	10.3 %	49.6 %
Upper Tankerhoosen River	4.5 %	84.6 %	4.7 %	76.3%
Walker Reservoir	19.9 %	41.2 %	29.13 %	31.8 %

Overall, most of the Tankerhoosen River subwatersheds are currently categorized as "fair" to "good" based on the riparian zone metric published by Goetz et al. (2003), while several of the



key headwater streams, including Railroad Brook and the Upper Tankerhoosen River, fall into the highest category. Comparison between the existing and future ratings indicates that four of the ten subwatersheds (Clarks Brook, Gages Brook South Tributary, Lower Tankerhoosen River, and Tucker Brook) are predicted to experience a decline in stream health as a result of future development and, in particular, development within the riparian corridor.

8.0 POLLUTANT LOADING

A pollutant loading model was developed using the land use/land cover data described in <u>Section 7.0</u>. The model was used to compare existing nonpoint source (NPS) pollutant loads from the watershed to projected future pollutant loads that would occur under a watershed buildout scenario. It is important to note that the results of this screening-level analysis are intended for the purposes of comparing existing and future conditions and not to predict future water quality. This section summarizes the methods and results of the analysis, which are presented in greater detail in <u>Appendix B</u>.

The Spreadsheet Tool for the Estimation of Pollutant Load (STEPL), Version 4.0, was used for this analysis. This model was developed for US EPA by Tetra Tech in EPA Region 5 and has since been modified for use in other areas of the country. The model calculates watershed pollutant loads for sediment and nutrients based on land use-related pollutant sources, including urban runoff, septic system failures, stream bank erosion, and agricultural activities. The model also allows simulation of best management practices (BMPs) and Low Impact Development (LID) practices to reduce pollutant loads.

Data obtained as part of the Land Use/Land Cover analysis presented in <u>Section 7.0</u> were used to generate model inputs. Several other model parameters were specified for each pollutant and subwatershed, including:

- Event Mean Concentrations (EMCs), which are literature values for the mean concentration of a pollutant in stormwater runoff for each land use, and
- Curve Number (CN), which is a measure of the runoff potential of the land surface and is a function of soil type, cover condition, and slope.

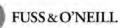
The model was applied to each subwatershed to estimate pollutant loads for each subwatershed under existing land use and future land use scenarios, as described in <u>Section 7.0</u>. The existing and future pollutant loads were compared to assess anticipated changes in loads for each subwatershed. <u>Table 8-1</u> presents the results of this analysis. Results are shown in terms of increase in pollutant loading rate (the mass of pollutant to be discharged from each acre of land in a watershed) and percent increase in pollutant load (based on the total pollutant discharge from each of the watersheds).

	(Lo	ad Inci	Rate Ind rease pe or ton]/a	r Acre,	Load Increase (%) (Total for Each Watershed)				
Watershed	Ν	Р	BOD	Sediment	Ν	Р	BOD	Sediment	
Bolton Notch Pond (318 ac)	0.66	0.10	2.7	0.012	9.6%	8.0%	10.9%	7.7%	
Clarks Brook (647 ac)	0.91	0.13	3.9	0.017	14.1%	12.9%	16.1%	11.7%	
Gages Brook (695 ac)	1.29	0.19	5.6	0.027	19.4%	17.0%	21.5%	16.7%	
Gages Brook South Tributary (680 ac)	0.73	0.11	3.1	0.014	12.2%	10.2%	14.1%	10.5%	
Lower Tankerhoosen River (306 ac)	1.31	0.10	6.3	0.022	20.0%	8.9%	27.6%	14.7%	
Middle Tankerhoosen River (1570 ac)	0.63	0.07	3.1	0.008	10.6%	7.6%	14.2%	5.8%	
Railroad Brook (1203 ac)	0.89	0.06	4.3	0.015	56.8%	20.3%	69.8%	46.4%	
Tucker Brook (934 ac)	0.67	0.04	3.3	0.012	14.1%	5.3%	18.0%	9.4%	
Upper Tankerhoosen River (1472 ac)	0.24	0.05	1.1	0.003	9.3%	11.1%	11.2%	6.0%	
Walker Reservoir (322 ac)	1.86	0.28	8.6	0.036	25.8%	23.3%	34.6%	21.6%	
Total (8149 ac)	0.77	0.09	3.5	0.013	16.0%	11.4%	19.9%	12.0%	

Table 8-1: Projected Pollutant Loading Rate and Load Increases

Several of the subwatersheds are predicted to experience significantly higher increases in pollutant loads and loading rates under a watershed buildout scenario. These include:

- Gages Brook. The existing conditions pollutant load model indicates that this subwatershed is characterized by both relatively high total pollutant loads and pollutant loading rates, with approximately 70% urban land use, the largest amount of industrial land use, and the second-highest commercial land use composition in the entire watershed. The buildout condition of this watershed is projected to result in a 19% increase in urban land use with a corresponding decrease in forest; and the new urban land is likely to consist of new residential and industrial development. As such, relatively large loads and loading rate increases may occur.
- Lower Tankerhoosen River. The existing conditions pollutant load model for this subwatershed predicts relatively small loads (since the watershed area is small) and moderate loading rates. Under a buildout scenario, this subwatershed is projected to result in more than a 20% increase in nitrogen and BOD loads. The resulting loading rates for these parameters are projected to be the second highest of the Tankerhoosen River subwatersheds.
- Railroad Brook. The projected buildout pollutant loadings in this subwatershed for nitrogen and BOD are anticipated to increase by approximately 57% and 70%, respectively. Significant increases are also anticipated in phosphorus and sediment loads. Currently, the Railroad Brook sub watershed is heavily forested, with comparatively little development. Several large tracts of land within this subwatershed are potentially available for future development, especially in Bolton and South Vernon,



which makes this watershed vulnerable to potentially significant pollutant load increases.

• *Walker Reservoir.* The existing conditions pollutant loading model suggests that this subwatershed has some of the highest levels of pollutant loads within the overall Tankerhoosen River watershed. Potential land use changes in this subwatershed include significant areas of new residential and mixed-use development, much of which is located adjacent to Walker Reservoir. These changes are predicted to result in the greatest increases in pollutant loading rates for all of the parameters evaluated.

9.0 COMPARATIVE SUBWATERSHED ANALYSIS

A Comparative Subwatershed Analysis was performed for the Tankerhoosen River subwatersheds to identify the subwatersheds with the greatest vulnerability and restoration potential. Subwatershed "metrics" were used to conduct this analysis. Metrics are numeric values that characterize the relative vulnerability and restoration potential of a subwatershed. The results of this analysis will be used to prioritize field assessment efforts in future phases of this study and to guide plan recommendations.

The analysis involves a screening level evaluation of selected subwatershed metrics that are derived by analyzing available GIS layers and other subwatershed data sources. The basic approach used to conduct the Comparative Subwatershed Analysis consisted of:

- 1. Delineation of subwatershed boundaries and review of available metric data.
- 2. Selection and calculation of metrics that best describe subwatershed vulnerability and restoration potential. (The metrics used to rank subwatershed vulnerability were selected separately from the metrics used to rank subwatershed restoration potential.)
- 3. Developing weighting and scoring rules to assign points to each metric.
- 4. Computing aggregate scores and developing initial subwatershed rankings.

Subwatersheds with higher aggregate "vulnerability" scores are more sensitive to future development and should be the focus of watershed conservation efforts to maintain existing high-quality resources and conditions. Subwatersheds with higher aggregate "restoration potential" scores are more likely to have been impacted and have greater potential for restoration to improve upon existing conditions. This approach enables watershed planners to allocate limited resources on subwatershed where restoration and conservation efforts have the greatest chances of success. The subwatersheds used in this analysis are those identified in <u>Section 5.1</u> of this document.

The following sections describe the metrics used and the rationale for their selection, how the various metrics were calculated, and the results of the evaluation. Available GIS and other data were used to compute the value of each metric.



Subwatershed Metric	How Metric is Measured	Indicates Higher Vulnerability Potential When	Metric Points
1. Impervious Cover Change	% increase in impervious cover in subwatershed	Increase in IC is high, suggesting greater development potential and stream impacts	Award 1 pt for each 1% increase in impervious cover
2. Impervious Cover Threshold	Comparison of current and future IC relative to ICM threshold	Predicted IC crosses "impacted" (12%) threshold, development could result in significant stream impacts	Award 5 pts for each exceedance of the 12% threshold
3. Stream Order	% of subwatershed consisting of 1 st or 2 nd order streams	Subwatershed consists of more lower order streams, vulnerability of headwater streams for habitat and water quality protection	Award 6 pts if 100% of streams are 1 st and 2 nd order; 4 pts if 50% are 1 st and 2 nd order; 2 pts if 33% are 1 st and 2 nd order; 0 pts if 0% are 1 st and 2 nd order
4. Pollutant Loading	% increase in pollutant loading in subwatershed	Increase in pollutant loading is high, suggesting water quality impacts from future development	Award 1 pt for each pollutant loading parameter > 10% and 3 pts for each parameter >20%
5. Industrial/ Commercial Land	% of subwatershed as industrial or commercial land	Industrial/commercial land is high, greater potential for water quality impacts from pollutant hot spot	Award 1 pt for each 2% of subwatershed classified as industrial or commercial/retail
6. Forest Cover	% of subwatershed with developable forest cover	Area of developable forest cover is high, potential for significant future reductions in forested land	Award 1 pt for each 5% of subwatershed with developable forest cover
7. Stream Corridor Forest Cover	% of stream corridor that is forested	Corridor forest cover is high, potential for significant future reductions in forested riparian areas if public ownership of corridor is low	Add 1 pt for each 10% increase in forest cover
8. Public Ownership of Stream Corridor	% of stream corridor that is publicly owned	Public ownership is low (see metric 7)	Add 1 pt for each 10% reduction of stream corridor in public ownership
9. Road Crossings	number of road crossings / square mile	Number of road crossings is high, greater potential for direct stormwater discharges from roadways	<1 = 0pts; 1 to 5 = 1 pts; 5 to 8 = 3 pts; 9 to 12 = 5 pts; 13-15 = 7pt; >15 = 10 pts
10. Developed Areas with Septic	% of subwatershed served by septic	Area served by septic is high, indicating potential for pollutant loadings from failing septic systems	Award 1 pt for each 5% of subwatershed area served by septic
11. Drinking Water Resources	Acreage of developable land within a public drinking water supply area	Area of developable land is high, greater potential for impacts to sensitive surface and groundwater drinking water supplies	Award 3 pts for each subwatershed within an aquifer protection area

Table 9-1: Summary of Subwatershed Vulnerability Metrics



9.1 <u>Priority Subwatersheds for Conservation</u>

The results of the subwatershed vulnerability analysis are summarized in <u>Table 9-2</u>.

Table 9-2: Results of Subwatershed Vulnerability Analysis

Subwatershed	Impervious Cover Change	Impervious Cover Threshold	Stream Order	Pollutant Loading	Industrial/ Commercial Land	Developable Forest Cover	Stream Corridor Forest Cover	Public Ownership of Stream Corridor	Road Crossings	Developed Areas Served by Septic	Drinking Water Resources	Total
Bolton Notch Pond	2	10	6	1	7	2	3	3	0	5	0	41
Clarks Brook	3	10	6	4	7	2	5	5	1	4	0	47
Gages Brook	3	5	6	6	11	4	6	6	3	5	0	55
Gages Brook South Tributary	2	5	6	4	1	5	6	5	3	5	0	42
Lower Tankerhoosen River	7	10	0	7	2	5	4	5	7	5	0	53
Middle Tankerhoosen River	3	10	2	2	2	2	4	5	3	3	3	38
Railroad Brook	2	0	6	12	0	6	9	0	5	1	0	40
Tucker Brook	2	0	6	2	0	3	5	6	3	2	0	28
Upper Tankerhoosen River	0	0	4	2	0	4	8	3	3	3	0	27
Walker Reservoir	9	10	4	4	2	3	2	5	10	6	0	56

As shown in <u>Table 9-2</u>, the following subwatersheds are considered most vulnerable to future development impacts and should be given highest priority for conservation efforts to maintain existing resource conditions:

- Clarks Brook,
- Gages Brook,
- Gages Brook South Tributary,
- Lower Tankerhoosen River,
- Walker Reservoir.



Subwatershed Metric	How Metric is Measured	Indicates Higher Restoration Potential When	Metric Points
1. Existing Impervious Cover	% impervious cover in subwatershed	Current impervious cover is low, suggesting range of possible sites for storage retrofits and stream repairs	<10% = 10 pts; 10 to 15% = 5 pts; >15% = 1 pt
2. Publicly- owned land	% of subwatershed that is publicly owned	Public land ownership is high, providing range of potential sites for restoration practices	Award 1 pt for each 2.5% of subwatershed in public ownership
3. Industrial Land	% of subwatershed that is industrial land	Industrial land is high, suggesting potential for source controls, discharge prevention, and on-site retrofits	Award 1 pt for each 2% of subwatershed classified as industrial
4. Forest Cover	% forest cover in subwatershed	Forest cover is low, suggesting potential for upland and riparian reforestation	<35% = 7pts; 36 to 50% = 5 pts; 50 to 70% = 3 pts; >70% = 1pt
5. Wetland Cover	% of subwatershed that is wetlands	Wetland cover is high, suggesting potential for wetland and riparian restoration	Award 1 pt for each 2% of subwatershed area
6.Development Potential	% of developable land in subwatershed	No more development is expected; stable conditions increase feasibility of stream repairs and storage retrofits	30 to 35% = 1pts; 25 to 30% = 4 pts; 20 to 25% = 7 pts; 15 to 25% = 10pt
7. Stream Density	stream miles / square mile	Stream density is high, suggesting greater feasibility of corridor practices	Award 1 pt for each 10% increase in stream density from watershed average of 1.3 stream miles / square mile
8. Stream Corridor Forest Cover	% of stream corridor that is forested	Corridor forest cover is low, suggesting feasibility of riparian reforestation and stream repairs	Add 1 pt for each 10% reduction in forest cover
9. Public Ownership of Corridor	% of stream corridor that is publicly owned	Public corridor ownership is high, suggesting greater feasibility of corridor practices	Add 1 pt for each 10% of stream corridor in public ownership
10. Road Crossings	number of road crossings / square mile	Number of road crossings is high, suggesting greater potential for stream repairs, culvert modifications	<1 = 0pts; 1 to 5 = 1 pts; 5 to 8 = 3 pts; 9 to 12 = 5 pts; 13-15 = 7pt; >15 = 10 pts
11. Developed Areas with Septic	% of subwatershed that is served by septic	Area served by septic is high, suggesting greater potential for septic system upgrades	Award 1 pt for each 5% of subwatershed area served by septic
12. Water Quality Impairments	number of water quality impairments / square mile	Number of water quality impairments is high, suggesting regulatory need to focus on WQ improvements	Award 3 pts for each water quality impairment identified

Table 9-3: Summary of Subwatershed Restoration Potential Metrics

9.2 <u>Priority Subwatersheds for Restoration</u>

The results of the subwatershed restoration potential analysis are summarized in <u>Table 9-4</u>.

Subwatershed	Existing Impervious Cover	Publicly-owned Land	Industrial Land	Forest Cover	Wetland Cover	Development Potential	Stream Density	Stream Corridor Forest Cover	Public Ownership of Stream Corridor	Road Crossings	Developed Areas Served by Septic	Water Quality Impairments	Total
Bolton Notch Pond	1	1	1	5	3	10	0	6	6	0	5	0	38
Clarks Brook	1	10	5	7	8	10	0	4	11	1	4	0	60
Gages Brook	5	12	6	5	8	4	10	3	12	3	5	6	79
Gages Brook South Tributary	5	3	0	3	3	1	14	2	9	3	5	9	57
Lower Tankerhoosen River	1	6	1	5	1	1	15	5	11	7	5	6	64
Middle Tankerhoosen River	5	6	1	5	6	10	5	5	10	5	3	0	61
Railroad Brook	10	0	0	1	6	1	9	0	0	5	1	0	34
Tucker Brook	10	10	0	5	6	7	11	4	11	1	2	0	66
Upper Tankerhoosen River	10	3	0	1	7	4	12	1	6	3	3	3	52
Walker Reservoir	1	10	1	7	4	1	0	7	9	10	6	0	55

Table 9-4: Results of Subwatershed Restoration Potential Analysis

As shown in <u>Table 9-4</u>, the following subwatersheds should be given highest priority for restoration potential to improve upon existing conditions:

- Clarks Brook,
- Gages Brook,
- Lower Tankerhoosen River,
- Middle Tankerhoosen River,
- Tucker Brook.

Based on the CSA results, the following subwatersheds are recommended for detailed assessment and planning:

- Clarks Brook,
- Gages Brook,
- Gages Brook South Tributary,
- Lower Tankerhoosen River,
- Middle Tankerhoosen River,
- Tucker Brook,
- Walker Reservoir.



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APPENDIX A

SPECIES LIST BELDING WILDLIFE MANAGEMENT AREA

APPENDIX A

FLORA OF BELDING WMA.

Club Mosses

<u>Club-moss family</u> (Lycopodiaceae) Tree club moss (Lycopodium obscurum)

Ferns

Bracken Fern Family (Dennstaedtiaceae) Hay-scented fern (Dennstaedtia punctilobula) Bracken fern (Pteridium aquilinum)

<u>Wood fern family</u> (Dryopteridaceae) Sensitive fern (*Onoclea sensibilis*) Spinulose wood fern (*Dryopteris spinulosa*) Christmas fern (*Polystichum acrosticoides*) Rock polypody (*Polypodium virginianum*)

<u>Royal fern family</u> (Osmundaceae) Cinnamon fern (*Osmunda cinnamomea*) Interrupted fern (*Osmunda claytoniana*) Royal fern (*Osmunda regalis*)

<u>Maidenhair Fern family</u> (Pteridaceae) Maidenhair fern (*Adiantum pedatum*)

<u>Marsh Fern family</u> (Thelypteridaceae) New York fern (*Thelypteris noveboracensis*)

Gymnosperms

<u>Pine family</u> (Pinaceae) Eastern white pine (*Pinus strobes*) Eastern red cedar (*Juniperus virginiana*) Red pine (*Pinus resinosa*) Pitch pine (*Pinus rigida*) Eastern hemlock (*Tsuga Canadensis*) Norway spruce (*Picea abies*)

Angiosperms (Flowering plants)

<u>Magnolia family</u> (Magnoliaceae) Tulip tree (*Liriodendron tulipifera*)

Laurel family (Lauraceae) Northern spicebush (Lindera benzoin) Sassafras (Sassafras albidum) and an an an array of the second s Second s

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Buttercup family (Ranunculaceae) Wood anemone (Anemone quinquefolia) Rue anemone(Thalictrum thalictroides) Goldthread (Coptis groenlandica) Kidneyleaf buttercup (Ranunculus abortivus) American pokeweed (Phytolacca Americana)

<u>Buckwheat family</u> (Polygonaceae) Arrow-leaf tearthumb (*Polygonum sagittatum*)

Witch-hazel family (Hamamelidaceae) Witchhazel (Hamamelis virginiana)

<u>Plane-tree family</u> (Plantanaceae) American sycamore (*Platanus occidentalis*)

Beech family (Fagaceae) Black oak (Quercus velutina) Red oak (Quercus rubra) White oak (Quercus alba) Scarlet oak (Quercus coccinea) American chestnut (Castanea dentata) American beech (Fagus grandifolia)

<u>Birch family</u> (Betulaceae) Speckled alder (*Alnus rugosa*) Black birch (*Betula lenta*) Gray birch (*Betula populifolia*) Paper birch (*Betula papyrifera*) Yellow birch (*Betula alleghaniensis*)

<u>Bayberry family (</u>Myricaceae) Sweetfern (*Comptonia peregrina*)

<u>Walnut family</u> (Juglandaceae) Pignut hickory (*Carya glabra*) Shagbark hickory (*Carya ovata*)

(Hypericaceae) St. John's wort (*hypericum perforatum*)

<u>Wintergreen family (Pyrolaceae)</u> Shinleaf (*Pyrola elliptica*) Spotted wintergreen (*Chimaphila maculata*) Indianpipe (Monotropa uniflora) Pinesap (Monotropa hypopithys)

Heath family (Ericaceae) Eastern teaberry (Gaultheria procumbens) Black huckleberry (Gaylussacia baccata) Mountain laurel (Kalmia angustifolium) Pinxter flower (Rhododendron nudiflorum) Highbush blueberry (Vaccinium corymbosum) Lowbush blueberry (Vaccinium angustifolium)

<u>Primrose family</u> (Primulaceae) Starflower (*Trientalis borealis*) Whorled loosestrife (*Lysimachia quadrifolia*)

<u>Violet family</u> (Violaceae) Common blue violet (*Viola papilionaceae*) Northern white violet (*Viola pallens*) Sweet white violet (*Viola blanda*) Field violet (*Viola arvensis*)

<u>Willow family (Salicaceae)</u> Quaking aspen (*Populus tremuloides*)

<u>Cucumber family</u> (Cucurbitaceae) Bur cucumber (*echinocystis lobata*)

Elm family (Ulmaceae) American elm (Ulmus americana)

Rose family (Rosaceae) White meadowsweet (Siriea latifolia) Steeplebush (Spirea tomentosa) Blackberry (Rubus allegheniensis) Raspberry (Rubus occidentalis) Multiflora Rose (Rosa multiflora) Strawberry (Fragaria virginiana) Black cherry (Prunus serotina) Apple (Prunus malus)

Pea family

Hop clover (*Trifolium aureum*) Red clover (*Trifolium pretense*) Cow vetch (*Viccia cracca*)

<u>Maple family</u> Sugar maple (*Acer saccharum*) Red maple (*Acer rubrum*) الا المراجع ال المراجع المراجع

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المعاون المعارك المعارك المعارك المعاد المعادلة الم المعادلة الم المعادلة الم <u>Cashew family</u> (Anacardiaceae) Staghorn sumac (*Rhus typhina*) Poison ivy (*Toxicodendron radicans*)

<u>Touch-me-not Family</u> (Balsaminaceae) Spotted touch-me-not (*Impatiens capensis*)

<u>Milkwort family</u> (Polygalaceae) Fringed polygala (*Polygala paucifolia*) Field milkwort (*Polygala sanguinea*)

<u>Staff-tree family</u> (Celastraceae) Winged euonymus (*Euonymus alatus*) Asiatic bittersweet (*Celastrus orbiculatus*)

<u>Holly family</u> (Aquifoliaceae) Winterberry (*Ilex verticillata*)

<u>Oleaster family</u> (Eleagnaceae) Autumn olive (*Eleagnus umbellate*) Russian olive (*Eleagnus angustifolium*)

<u>Grape family</u> (Vitaceae) Virginia creeper (*Parthenocissus quinquefolia*) Fox Grape (*Vitis labrusca*)

<u>Dogwood family</u> (Cornaceae) Silky dogwood (*Cornus amomum*)

<u>Ginseng family</u> (Araliaceae) Ginseng (*Panax quinquefolium*) Dwarf ginseng (*Panax trifolium*)

Carrot family (Apiaceae) Queen Anne's Lace (Daucus carota)

<u>Honeysuckle family</u> (Caprifoliaceae) Tartarian Honeysuckle (*Lonicera tatarica*) Elderberry (*Sambucus canadensis*) Maple-leaved viburnum (*Viburnum acerifolium*) Arrowwood (*Viburnum dentatum*)

<u>Aster family</u> (Asteraceae) Yarrow (Achillea millefolium) New York Aster (Aster novi-belgii) Oxeye daisy (Chrysanthemum lleucanthemum) Bull thistle (Cirsium vulgare)

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Black-eyed Susan (Rudbeckia hirta)	
Rough-stemmed goldenrod (Solidaga rugosa)	
Common dandelion (Taraxacum officinale)	and the second secon
Pineapple weed (Matricaria matricarioides)	and the second secon
Horseweed (Erigeron canadensis)	e se provinsi se andre e grander e se service
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Bedstraw family (Rubiaceae) Bluets (Houstonia caerulea) Partridgeberry (Mitchella repens)

Joe-Pve weed (Eunatorium maculata)

Dogbane family (Apocynaceae) Periwinkle (Vinca minor) Common milkweed (Asclepias syriaca)

Nightshade family (Solanaceae) Bittersweet nightshade (Solanum dulcamara) Jimsonweed (*Datura stramonium*)

Olive family (Oleaceae) White ash (*Fraxinus americana*)

Figwort family (Scrophulariaceae) Blue toadflax (Linaria canadensis) Butter-and-eggs (Linaria vulgaris) Monkey flower (Mimulus ringens) Common mullein (Verbascum thapsus) Thyme-leaved speedwell (Verbascum serpyllifolia)

Mint family (Lamiaceae) Heal-all (Prunella vulgaris) Wild mint (mentha arvensis)

Melanthium family (Melanthiaceae) False hellebore (*Veratrum nigrum*)

Trillium family (Trilliaceae) Purple trillium (*Trillium erectum*) Nodding trillium (*Trillium cernuum*)

Lily family (Liliaceae)

Canada Mayflower (*Maianthemum canadense*) False Solomon's seal (Smilacina racemosa) Smooth Solomon's seal (*Polygonatum biflorum*) Trout lily (*Erythronium americanum*) Indian cucumber root (Medeola virginiana)

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Cathrier family (Smilaceae)

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Greenbrier (Smilax rotundifolia)

<u>Orchid family</u> (Orchidaceae) Nodding ladies' tresses (*Spiranthes cernua*) Pink lady's slipper (*Cypripedium acaule*) Rattlesnake plantain (*Goodyera pubescens*)

<u>Asparagus family</u> (Asparagaceae) Asparagus (*Asparagus officinalis*)

<u>Spiderwort family</u> (Commelinaceae) Asiatic dayflower

<u>Rush family</u> Juncaceae Canadian rush (*Juncus canadensis*) Common rush (*Juncus effusus*) Poverty rush (*Juncus tenuis*)

Sedge family (Cyperaceae) Yellow nutsedge (Cyperus esculentus) Fringed sedge (Carex crinita) Greater bladder sedge (Carex intumescens) Shallow sedge (Carex lurida) Pennsylvania sedge (Cares pensylvanica) Tussock sedge (Carex stricta) Green bulrush (Scirpus atrovirens) Wool grass (Scirpus cyperinus) Panicled bulrush (Scirpus microcarpus) Fox sedge (Carex vulpinoidea) - Metzler

Grass family (Poaceae)

Orchard grass (Dactylis glomerata) Crabgrass (Digitaria sanguinalis) Witch grass (Panicum capillare) Reed canary grass (Phalaris arundinaceae) Green foxtail (Setaria viridis) Velvet grass (Holcus lanatus) – Metzler Timothy (Phleum pretense) – Metzler Cheatgrass (Bromus tectorum) – Metzler Sweet vernal grass (Anthoxanthum odoratum) - Metzler

<u>Water plantain family</u> Alismataceae Arrowhead (*Sagittaria latifolila*)

<u>Arum family</u> (Araceae) Skunk cabbage (Symplocarpus foetidus) Jack-in-the-pulpit (Arisaema triphyllum) Cat-tail family (Typhacea) Common cattail (Typha latifolia)

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INVERTEBRATES

Annelids Earthworm (Oligochaeta) Leech (Hirudinea)

Crustaceans

Crayfish (Decapoda)

Molluses

Pea clam (*Sphaeriidae*) Eastern pearlshell (*Margaritifera margaritifera*) Eastern elliptio (*Elliptio complanata*) Lymnaid snail (*Pseudosuccinea columella*) Planorbid snail (Helisoma)

Insects

Mayflies (Ephemeroptera) Drunella (Ephemerellidae) Flat-head mayfly (*Heptageniidae:Epeorus*) Stenonema (*Heptageniidae*) Baetidae

True flies (Diptera) Midge (Chironomidae) Dance fly (*Empididae*) Sand fly (*Psychodidae*) والمراجع والمراجع والمراجع والمتعاد والمحاصر والمحاص والمحاص والمحاص والمحاص والمحاص والمحاص والمحاص والمحاص وا Black fly (Simuliidae) Crane fly (*Tipulidae*) Phantom crane fly (Ptychopteridae :Bittacomorpha clavipes)

Stoneflies (Plecoptera) Chloroperlidae Glossosomatidae Nemouridae Peltoperlidae Perlidae Perlodidae

<u>Caddisflies</u> (Trichoptera)

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Chimarra Hydropsychidae Lepidostoma Limnephilidae Philopotamidae Rhyacophila

<u>Dobsonflies and fishflies</u> (Megloptera) Corydalus Nigronia

<u>Beetles</u> (Coleoptera) Predaceous diving beetle (*Dytiscidae*) Water beetle (*Elmidae*) Water scavenger beetle (*Hydrophilidae*) Water penny beetle (*Psephenidae*) Scarab beetle (*Scarabaeidae*) Green tiger beetle (*Cicindela sexguttata*) Burying beetle (*Nicrophorus arbicollis*)

ODONATA

Damselflies River jewelwing (Calopteryx maculata) Ebony jewelwing (Calopteryx aequibilis) Elegant spreadwing (Lestes inaequalis) Fragile forktail (Ischnura posita)

Dragonflies

Brown darner (*Boyeria vinosa*) Common green darner (*Anax junius*) Spangled skimmer (*Libellula cyanea*) Yellow-legged meadowhawk (*Sympetrum vicinum*) Banded-winged meadowhawk (*Sympetrum semicinctum*) Cherry-faced meadowhawk(*Sympetrum internum*) Clubtail (Gomphidae)

Lepidoptera

Butterflies

Peck's skipper (*Polites peckius*) Crossline skipper (*Polites origenes*) Delaware skipper (Anatrytone logan) Tiger swallowtail (Papilio glaucus) Spicebush swallowtail (*Papilio Troilus*) Cabbage butterfly (*Pieris rapae*) Clouded sulphur (*Colias philodice*) Small copper (Lycaena phlaeas) Eastern tailed blue (*Everes comyntas*) Spring azure (Celastrina "ladon") Red-spotted purple (*Limenitis arthemis*) Great spangled fritillary (Speyeria cybele) Pearl crescent (*Phyciodes tharos*) Monarch (Danaus plexippus) Viceroy (Limenitis archippus)

Moths

Garden tortrix (*Ptycholoma peritana*) Lesser maple spanworm moth (*Itame pustularia*) Blurry chocolate angle (Semiothisa transitaria) Minor angle (Semiothisa minorata) Four-spotted angle (Semiothisa quadrinotaria) White spring moth (*Lomographa vestaliata*) Lesser grapevine looper moth (*Eulithis diversilineata*) Greater grapevine looper moth (*Eulithis gracilineata*) Sweetfern geometer (*Cylophora pendulinaria*) Cross-lined wave (Calothysanis amaturaria) Red twin spot (*Xanthorhoe ferrugata*) White-striped black (Trichodezia albovittata) Brown bark carpet (*Horisme intestinata*) Black-rimmed prominent (*Pheosia rimosa*) Painted lichen moth (*Hypoprepia fucosa*) Clymene moth (*Haploa clymene*) Harnessed moth (Apantesis phalerata) Pink-shaded fern moth (*Callopistria mollissima*) Copper underwing (Amphipyra pyramidoides) Common pinkband (*Ogdoconta cinereola*) Eight-spotted forester (Alypia octomaculata) Pink-barred lithacodia (Lithacodia carneola) Decorated owlet (Pangrapta decoralis) Spotted grass moth (*Rivula propingualis*) American idia (*Idia americalis*) Common idia (*Idia aemula*) Early zanclognatha (Zanclognatha cruralis)

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 a) the second sec Morbid owlet (*Chytolita morbidalis*) Dark-spotted palthis (*Palthis angulalis*)

FISH

American Eel (Anguilla rostrata) Bluegill (Lepomis macrochirus) Brook Trout (Salvelinus fontinalis) Blacknose Dace (Rhinichthys atratulus) Brown Trout (Salmo trutta) Chain Pickerel (Esox Niger) Fallfish (Semotilus corporalis) Golden Shiner (Notemigonus crysoleucas) Longnose Dace (Rhinichthys cataractae) Largemouth Bass (Micropterus salmoides) Rainbow Trout (Oncorhynchus mykiss) Tessellated darter (Etheostoma olmstedi) White Sucker (Catostomus commersoni) Yellow Perch (Perca flavescens)

AMPHIBIANS

American toad (Bufo americanus) Gray treefrog (Hyla versicolor) Northern spring peeper (Pseudacris c. crucifer) Bullfrog (Rana catesbeiana) Green frog (Rana clamitans melanota) Pickerel frog (Rana palustris) Wood frog (Rana sylvatica) Northern Redback salamander (Plethodon cinereus) Spotted salamander (Ambystoma maculatum) Northern two-lined salamander (Eurycea bislineata) Red-spotted newt (Notophthalmus v. viridescens)

REPTILES

Painted turtle (*Chrysemys picta*) Eastern box turtle (*Terrapene c. carolina*) Eastern milk snake (*Lampropeltis t. triangulum*) Eastern garter snake (*Thamnophis s. sirtalis*)

BIRDS

Ciconiiformes Great Blue Heron (Ardea herodias) Turkey Vulture (Cathartes aura) **Falconiformes** Red-tailed Hawk (Buteo jamaicensis) Broad-winged hawk (Butea platypterus) Cooper's hawk (Accipiter cooperii) Sharp-shinned hawk (Accipiter striatus) Gallifomes Wild Turkey (Meleagris gallopavo) Charadriiformes American woodcock (Scolopax minor) Killdeer (Charadrius vociferus) **Columbiformes** Mourning Dove (Zenaida macroura) Cuculiformes Yellow-billed cuckoo (Coccyzus americanus) **Strigiformes** Barred Owl (Strix varia) Great horned owl (Bubo virginianus) **Apodiformes** Chimney Swift (Chaetura pelagica) **Coraciiformes** Belted Kingfisher (Ceryle alcyon) Piciformes Downy Woodpecker (Picoides pubescens) Hairy woodpecker (Picoides villosus) Red-bellied Woodpecker (Melanerpes carolinus) Pileated woodpecker (Dryocopus pileatus) Yellow-shafted Flicker (Colaptes auratus) **Passeriformes Tvrannidae** Eastern Wood-Pewee (Contopus virens) Eastern Phoebe (Sayornis phoebe) Great Crested Flycatcher (Myiarchus crinitus) Olive-sided flycatcher (Nuttallornis borealis) Eastern Kingbird (Tyrannus tyrannus) Vireonidae Red-eyed Vireo (Vireo olivaceus) Warbling Vireo (Vireo gilvus) Yellow-throated vireo (Vireo flavifrons) Corvidae Common raven (Corvus corax) American Crow (Corvus brachyrhynchos) Blue Jay (Cyanocitta cristata)

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Hirundidae

Tree Swallow (Iridoprocne bicolor) Barn Swallow (Hirundo rustica)

Paridae

Black-capped Chickadee (Poecile atricapillus) Tufted Titmouse (Baeolophus bicolor) Sittidae

Red-breasted Nuthatch (Sitta carolensis) White-breasted Nuthatch (Sitta Canadensis)

Certhiidae

Brown creeper (Certhia familiaris)

Troglodytidae

Carolina Wren (Thryothorus ludovicianus) House Wren (Troglodytes aedon)

Turdidae

Eastern Bluebird (Sialia sialis) Swainson's thrush (Catharus ustulatus) Veery (Catharus fuscescens) Wood Thrush (Hylocichla mustelina) American Robin (Turdus migratorius)

Mimidae

Gray Catbird (Dumetella carolinensis) Northern Mockingbird (Mimus polyglottos) Brown Thrasher (Toxostoma rufum)

Bombycillidae

Cedar Waxwing (Bombycilla cedrorum) **Parulidae**

Blue-winged Warbler (Vermivora pinus) Nashville warbler (Vermivora ruficapilla) Northern parula (Parula americana) Yellow Warbler (Dendroica petechia) Chestnut-sided warbler (Dendroica pensylvanica) Yellow-rumped warbler (Dendroica coronata) Black-throated green warbler (Dendroica virens) Pine Warbler (Dendroica pinus) Prairie warbler (Dendroica discolor) Palm warbler (Dendroica palmarum) Blackpoll warbler (Dendroica striata) Blackburnian warbler (Dendroica fusca) Cerulean warbler (Dendroica cerulean) Black-and-white warbler (Mniotilta varia) American redstart (Setophaga ruticilla) Ovenbird (Seirus aurocapillus) Louisiana waterthrush (Seiurus motacilla) Common Yellowthroat (Geothlypis trichas) Canada warbler (Wilsonia canadensis)

Thraupidae

Scarlet Tanager (Piranga olivacea)

Emberizidae

Eastern Towhee (Pipilo erythrophthalmus) Chipping Sparrow (Spizella passerina) White-throated sparrow (Zonotrichia albicollis) Song Sparrow (Melospiza melodia) Dark-eyed junco (Junco hyemalis)

Cardinalidae

Northern Cardinal (*Cardinalis cardinalis*) Rose-breasted Grosbeak (*Pheucticus ludovicianus*) Indigo Bunting (*Passerina cyanea*) Icteridae

Red-winged Blackbird (Agelaius phoeniceus) Common Grackle (Quiscalus quiscula) Brown-headed Cowbird (Molothrus ater) Baltimore Oriole (Icterus galbula) Fringillidae American Goldfinch (Carduelis tristis)

MAMMALS

Short-tailed shrew (Blarina brevicauda) Red-backed vole (Clethrionomys gapperi) Meadow vole (Microtus pennsylvanicus) Deer mouse (Peromyscus leucopus) Jumping mouse (Zapodidae) Chipmunk (Tamiasciurus hudsonicus) Gray squirrel (Sciurus carolinensis) Red squirrel (Tamiasciurus hudsonicus) Muskrat (Odontra zibethicus) Porcupine (Erethizon dorsatum) Eastern cottontail rabbit (Sylvilagus floridanus) Gray fox (Urocyon cinereoargenteus) Raccoon (Procyon lotor) Short-tailed weasel (Mustela erminae) Fisher (Martes pennanti) Striped skunk (Mephitis mephitis) White-tailed deer (Odocoileus virginianus)



APPENDIX B

POLLUTANT LOADING EVALUATION

Pollutant Loading Analysis Tankerhoosen River Watershed Baseline Assessment

1.0 INTRODUCTION

A pollutant loading analysis was performed for the Tankerhoosen River watershed in support of the Baseline Watershed Assessment to assess the potential for increases in nonpoint source (NPS) pollutant loads. The model was used to compare existing nonpoint source (NPS) pollutant loads from the watershed to projected future pollutant loads that would occur under a watershed buildout scenario. The predicted change in pollutant loadings in each of the subwatersheds was then examined to assess their relative vulnerability to future development.

2.0 MODEL DESCRIPTION

A pollutant loading model was developed using the land use/land cover data described in <u>Section 7.0</u> of the Baseline Watershed Assessment report (Fuss & O'Neill 2008). The model was used to compare pollutant loadings from the watershed under existing land use conditions to future pollutant loadings under a watershed buildout scenario. It is important to note that the results of this screening-level analysis are intended for the purposes of comparing existing to future conditions and not to predict future water quality.

The Spreadsheet Tool for the Estimation of Pollutant Load (STEPL), Version 4.0, was used for this analysis. This model was developed for US EPA by Tetra Tech in EPA Region 5 and has since been modified for use in other areas of the country. The model calculates watershed pollutant loads based on land use-related pollutant sources, including urban runoff, septic system failures, stream bank erosion, and agricultural activities. The model also allows simulation of best management practices (BMPs) and Low Impact Development (LID) practices to reduce pollutant loads.

The focus of the Tankerhoosen watershed pollutant loading model was future development of presently undeveloped land and re-development of developed land with higher-intensity land uses (See <u>Section 7.2 of Fuss & O'Neill 2008</u>), since these are likely sources of increased pollutant loads. Agricultural NPS pollutant loadings were not considered in the analysis since agricultural land comprises a very small percentage of the land uses within the watershed.

The pollutants modeled in this analysis are the default pollutants contained in the STEPL model: total phosphorus, total nitrogen, biological oxygen demand, and total suspended solids. These pollutants are the major parameters of concern in environmental systems.

Nitrogen and phosphorus are nutrients that promote the growth of algae and plants in water. When this biomass dies and settles to the bottom of water bodies, its decomposition consumes oxygen which is needed by other organisms for survival. Nitrogen is generally present in relatively small quantities compared to other nutrients in salt water systems, such as Long Island Sound, so limiting its concentration limits the growth of algae. In fresh water systems, such as the stream and impoundments in the Tankerhoosen River watershed, phosphorus is the nutrient that is relatively scarce and thus limits algal growth.



Biological oxygen demand (BOD) is a measure of the amount of oxygen that a pollutant consumes as it decomposes (e.g., one pound of BOD consumes one pound of oxygen). A given BOD loading to a water body effectively consumes an equivalent amount of oxygen from that water body, making it unavailable to aquatic organisms.

Total suspended solids (TSS) is a measure of both biodegradable and mineral sediment. Its discharge to a water body results in turbidity and sedimentation. TSS may also have secondary effect; biodegradable TSS exerts a BOD load, and mineral TSS can be associated with particulate phosphorus.

3.0 MODEL PARAMETER SELECTION

STEPL uses algorithms that calculate nutrient and sediment loads from different land uses to determine watershed pollutant loadings. The user specifies several model parameters for each land use in the watershed that are used to estimate runoff quantity and pollutant levels. These parameters include:

- Event Mean Concentrations (EMCs), which are literature values for the mean concentration of a pollutant in stormwater runoff for each land use, and
- Curve Number (CN), which is a measure of the runoff potential of the land surface and is a function of soil type, cover condition, and slope.

The model uses these parameters to estimate the runoff quantity and pollutant loading using data specific to each subwatershed, supplied by the user, as well as default climate data for the subject county. In addition to these parameters, the model includes percent impervious surface values for each land use. As part of this project, the model was modified to accept user-specified impervious surface values for each land use.

A literature review was conducted to determine EMCs values for use in the study. STEPL includes default EMC values for each land use within the watershed. Since comparison between existing and proposed watershed conditions is the focus of this project, EMC values were selected to reflect the relative difference in NPS pollutant characteristics between the existing and future land use. <u>Table 1</u> shows EMC values from several sources for the pollutants of interest.

						Lar	nd Use												
Source Pollutant	Pollutant	Cropland	Open Space	Commercial	High Density Residential	Institutional	Industrial	Low Density Residential	Forest	Transport	Vacant	Units							
	N	1.9	1.5	2	2.2	1.8	2.5	2.2	0.2	3	1.5	mg/L							
STEPL	Р	0.3	0.15	0.2	0.4	0.3	0.4	0.4	0.1	0.5	0.15	mg/L							
SIEPL	BOD	4	4	9.3	10	7.8	9	10	0.5	9.3	4	mg/L							
	TSS	-	70	75	100	67	120	100	-	150	70	mg/L							
NSQD	N*	-	1.2	2.2	2	-	2.1	-	-	2.3	-	mg/L							
	Р	-	0.25	0.22	0.3	-	0.26	-	-	0.25	-	mg/L							
	BOD	-	4.2	11.9	9	-	9	-	-	8	-	mg/L							

Table 1. Runoff Event Mean Concentrations (EMCs)



						Land Use									
Source	Pollutant	Cropland	Open Space	Commercial	High Density Residential	Institutional	Industrial	Low Density Residential	Forest	Transport	Vacant	Units			
	TSS	-	51	43	48	-	77	-	-	99	-	mg/L			
	N*	-	1.5	1.75	2.6	-	-	-	-	-	-	mg/L			
NURP	Р	-	0.1	0.201	0.38	-	-	-	-	-	-	mg/L			
NUKP	BOD	-	-	9.3	10	-	-	-	-	-	-	mg/L			
	TSS	-	70	57	101	-	-	-	-	-	-	mg/L			
	N*	-	-	2	2	-	-	2	-	2	-	mg/L			
WTM	Р	-	-	0.26	0.26	-	-	0.26	-	0.26	-	mg/L			
VVTIVI	BOD	-	-			-	-		-		-	mg/L			
	TSS	-	-	55	55	-	-	55	-	55	-	mg/L			
	N*	-	-	13.7	13.7	-	10.6	10.0	-	-	-	kg/ha/yr			
BEC	Р	-	-	2.7	2.7	-	2.6	1.9	-	-	-	kg/ha/yr			
DEC	BOD	-	-			-			-	-	-	kg/ha/yr			
	TSS	-	-	748.0	748.0	-	802.5	456.0	-	-	-	kg/ha/yr			
	N*	1.9	1.5	2.2	2	1.8	2.5	1.8	0.2	3	1.5	mg/L			
Selected	Р	0.3	0.15	0.4	0.2	0.3	0.4	0.3	0.1	0.5	0.15	mg/L			
Selected	BOD	4	4	10	9.3	7.8	9	7.8	0.5	9.3	4	mg/L			
	TSS	-	70	100	75	67	120	67	-	150	70	mg/L			

See References for Source Information

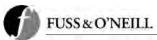
The majority of selected values were obtained from STEPL, with adjustments to ensure consistency with other sources. These adjustments include exchanging the multi-family and commercial values, since development included in the multi-family category is assumed to be less intensive in the Tankerhoosen watershed (See <u>Section 4.0</u>) than typical, and since the default commercial sediment EMC value was lower than sediment levels of other less sediment-intensive land uses. Similarly, since the single-family land use category selected for the watershed includes only large lot residential areas, the selected EMCs for these areas were reduced to Institutional land use levels.

As part of this project, the impervious surface coefficients in STEPL were adjusted for use in generating existing and proposed impervious surface estimates. The default factors, literature values for factors, and selected factors are presented in <u>Table 2</u>.

	Imperv	ious Cover Coeff	ficients
Land Use	STEPL	NEMO ¹	Selected
Commercial	0.85	0.205 - 0.557	0.50
Industrial	0.70	0.264 - 0.557	0.40
Institutional	0.50	-	0.30
Transportation	0.95	0.433	0.43
Multi-family	0.75	0.09 - 0.39	0.24
Single-family	0.30	0.065 - 0.12	0.10
Vacant (developed)	0.70	-	0.41
Open Space	0.01	0.001 - 0.094	0.01

Table 2. Impervious Surface Coefficients

¹Sleavin et al. (2000) and Prisloe et al. (2003)



The STEPL model also includes input parameters related to failing septic systems in the watershed. Parameters include the typical population per household and septic system failure rate. Default values were used for the typical population per household and septic system failure rate due to the limited availability of local data.

4.0 MODEL INPUT DATA

Land use/land cover data that is described in <u>Section 7.0</u> of the Baseline Watershed Assessment was adapted for integration into the STEPL model. Data was prepared in this manner for both the existing conditions and future conditions (watershed buildout) pollutant loading scenarios. STEPL allows fewer land use categories than contained in the land use/land cover data obtained from other sources, so several data categories were combined for use in the model. <u>Table 3</u> summarizes the assignment of STEPL land use categories for each of the land use/land cover data categories.

Data Category	STEPL Category
Agriculture	Cropland
Cemetery	Open Space (urban)
Commercial	Commercial (urban)
Condominium	Multi-family (urban)
Government/Non-Profit	Institutional (urban)
Group Quarters	Institutional (urban)
Health/Medical	Institutional (urban)
Industrial	Industrial (urban)
Mixed Use	Commercial (urban)
Multi-Family	Multi-family (urban)
One Family	Multi- or Single-family (urban)
Resource/Recreation	Forest
Retail	Commercial (urban)
ROW	Transportation (urban)
School	Institutional (urban)
Three Family	Multi-family (urban)
Two Family	Multi-family (urban)
Undeveloped	Forest
Unknown	Vacant - Developed (urban)
Water	Not Considered

Table 3. Source Data - STEPL Category Correlation

STEPL defines urban land uses differently from agriculture and forest. All urban land uses are lumped into a single land use category, and urban land cover characteristics are distinguished based on land use subcategories, which include commercial, industrial, institutional, transportation, multi-family residential, single-family residential, urban cultivated, vacant (developed), and open space land uses. Since the source land use data included many residential land use categories and STEPL only provides two residential categories, residential uses for all but the largest single-family residential parcels was included in the multi-family category. The Tankerhoosen River watershed has large areas of rural-residential land use with parcel sizes of greater than 2 acres. As such, parcels smaller than two acres were considered to

be high density residential and parcels larger than two acres were considered low density residential. <u>Table 4</u> summarizes the composition of single-family residential land use based on parcel size ranges.

Watershed	0 - 22k sf	22k sf - 2 ac	2 - 5 acres	> 5 acres
Bolton Notch Pond	3.2%	49.7%	47.1%	0.0%
Clarks Brook	21.4%	36.0%	18.0%	24.6%
Gages Brook	11.4%	37.8%	25.4%	25.4%
Gages Brook South Tributary	0.9%	47.4%	33.6%	18.1%
Lower Tankerhoosen River	21.4%	43.9%	34.4%	0.3%
Middle Tankerhoosen River	13.6%	60.3%	15.7%	10.5%
Railroad Brook	0.2%	45.9%	53.7%	0.2%
Tucker Brook	22.0%	54.4%	11.1%	12.6%
Upper Tankerhoosen River	1.0%	79.9%	18.8%	0.3%
Walker Reservoir	17.0%	43.2%	24.0%	15.7%

 Table 4. Composition of Single-Family Residential Land Use Based on Parcel Size

Septic system data is also required for the STEPL model. Sewer service area GIS data from Connecticut DEP was used to screen out developed parcels in the Tankerhoosen watershed; parcels located completely outside of mapped sewer service areas were assumed to be served by septic systems. The resulting number of developed parcels without sewer service were divided into residential systems (single-family through multi-family systems) and other developed systems (including condominiums, industrial, commercial, and institutional systems). The residential systems were assumed to have similar characteristics and the other developed systems were assumed to be approximately 5 times the size of the residential systems, on average (this factor was estimated based on the total land area feeding these systems and an estimated intensity of use).

Hydrologic Soil Group (HSG) data are also required by the model. This data, which is available from the U.S. Natural Resource Conservation Service (NRCS), describes the infiltration characteristics of most soils in the county. Identifiers for the soil groups range from Type A soils, including sands and other soils that are very well drained and result in little runoff, to Type D soils, which are poorly drained, often being compacted, having high clay content and high groundwater levels. Soils data were compiled for each subwatershed and assimilated into an average HSG value. Each subwatershed was found to have Type B soil characteristics, on average, with the exception of the Gages Brook subwatershed, which was found to have Type C soil characteristics.

5.0 CURRENT POLLUTANT LOADINGS

5.1 <u>Input</u>

The following land use data were entered into the STEPL spreadsheet to create an existing conditions pollutant loading model. These inputs were reduced form the data presented in <u>Section 7.1</u> of the Baseline Watershed Assessment. In general, agricultural land use (i.e. cropland) was the least common of the non-urban uses. In most subwatersheds, urban uses dominate, although forests compose more than half of the land area in the Railroad Brook and Upper Tankerhoosen River watersheds.

		Land Use A	Area (ac)		Land Use Area Composition			
Watershed	Urban	Cropland	Forest	Total	Urban	Croplan d	Forest	
Bolton Notch Pond	183.9	0.0	134.7	318.6	58%	0%	42%	
Clarks Brook	533.3	3.6	110.5	647.4	82%	1%	17%	
Gages Brook	485.8	28.2	181.5	695.5	70%	4%	26%	
Gages Brook South Tributary	491.3	5.7	183.3	680.3	72%	1%	27%	
Lower Tankerhoosen River	179.4	0.0	127.1	306.5	59%	0%	41%	
Middle Tankerhoosen River	1185.5	22.6	362.4	1570.5	75%	1%	23%	
Railroad Brook	377.6	0.0	825.3	1202.8	31%	0%	69%	
Tucker Brook	648.8	43.0	241.8	933.5	69%	5%	26%	
Upper Tankerhoosen River	519.2	0.0	952.6	1471.9	35%	0%	65%	
Walker Reservoir	192.2	0.0	129.8	322.0	60%	0%	40%	

Table 5. Land Use Input Data

<u>Table 6</u> presents the composition of the urban land use areas listed in <u>Table 5</u>. In general, residential land use is the most prevalent in the urbanized areas, although transportation corridors are the predominant urban land use in the Bolton Notch Pond and Lower Tankerhoosen River watersheds, and comprise greater than 20% of urban land use in three of the ten watersheds.

			Urb	an Land L	Jse Compos	ition (%)		
Watershed	Com.	Ind.	Inst.	Trans.	Dense Res.	Rural Res.	Vacant	Open Space
Bolton Notch Pond	25.5	2.1	5.7	29.4	17.6	15.7	4.0	0.0
Clarks Brook	4.2	11.9	0.3	13.9	49.7	18.6	1.4	0.0
Gages Brook	13.7	16.7	8.8	7.7	27.5	25.0	0.0	0.6
Gages Brook South Tributary	2.4	0.0	4.0	19.7	35.4	37.9	0.6	0.0
Lower Tankerhoosen River	4.3	4.1	9.8	32.6	30.6	14.1	2.0	2.5
Middle Tankerhoosen River	2.7	1.9	1.8	17.9	55.8	18.5	1.0	0.4
Railroad Brook	0.0	0.0	0.0	4.5	43.4	50.7	1.4	0.0
Tucker Brook	0.3	0.0	4.5	11.9	63.9	19.3	0.1	0.0
Upper Tankerhoosen River	0.0	0.0	0.7	13.6	66.9	15.1	3.3	0.4
Walker Reservoir	6.3	2.7	0.0	37.8	39.4	11.5	2.3	0.0

Table 6. Urban Land Use Composition

<u>Table 7</u> presents the total estimated number of septic systems in the Tankerhoosen River watershed, determined using the methods described in <u>Section 4.0</u>. Septic systems are assumed to be present at lots not included in or abutting the sewer service area shown in the Baseline Watershed Assessment report. As discussed in <u>Section 4.0</u>, "other" septic systems includes septic systems for land uses other than single-family and multi-family residential land uses, such as condominiums, group quarters, commercial, industrial parcels. These systems are assumed to serve an equivalent population of 5 times a residential system on average. Note that these

septic system estimates and are intended only for estimating increases in NPS pollutant loads and should not be used for other purposes.

	Number of Septic Systems						
Watershed	Residential	Other	Equivalent Total				
Bolton Notch Pond	43	2	53				
Clarks Brook	108	8	148				
Gages Brook	81	1	86				
Gages Brook South Tributary	236	4	256				
Lower Tankerhoosen River	43	1	48				
Middle Tankerhoosen River	169	7	204				
Railroad Brook	76	0	76				
Tucker Brook	98	0	98				
Upper Tankerhoosen River	198	3	213				
Walker Reservoir	42	2	52				

Table 7.	Estimated	Number	of Septic	Systems
	Lotiniatoa			0,500115

5.2 <u>Results</u>

<u>Table 8</u> presents total estimated loadings of total nitrogen, total phosphorus, BOD, and TSS for each subwatershed, as well as the loading rate for each subwatershed. In terms of total existing loads, the largest loads of pollutants originate in the Middle Tankerhoosen River, Gages Brook, Gages Brook South Tributary, Clarks Brook, and Tucker Brook subwatersheds. As such, pollutants from these areas are likely to have the largest effect on water quality in the Tankerhoosen River.

Since some of these watersheds are large compared to others, it is useful to look at the data in terms of the loading rate, which is the load of pollutant per unit land area. A high loading rate indicates dense pollutant sources, which suggests that implementation of best management practices (BMPs) in these areas would be more effective in reducing pollutant loads. Pollutant loading rates are relatively uniform between many of the watersheds. Outstanding loading rates include those from Railroad Brook and the Upper Tankerhoosen River, which are significantly lower than rates from other subwatersheds, and those from the Walker Reservoir, which are significantly elevated compared to loads from other subwatersheds. The highlighting in <u>Table 8</u> identifies subwatersheds with high (orange), moderate (yellow), and low (green) pollutant loadings.

	Ν	Р	BOD	Sediment	Ν	Р	BOD	Sediment
Watershed	lb∕yr	lb∕yr	lb/yr	t/yr	lb/ac-yr	lb/ac-yr	lb/ac-yr	t/ac-yr
Bolton Notch Pond (318 ac)	2175	385	7895	51	6.8	1.2	24.8	0.2
Clarks Brook (647 ac)	4157	669	15686	92	6.4	1.0	24.2	0.1
Gages Brook (695 ac)	4640	787	18084	115	6.7	1.1	26.0	0.2
Gages Brook South Tributary (680 ac)	4062	720	14877	89	6.0	1.1	21.9	0.1
Lower Tankerhoosen River (306 ac)	2009	343	6987	47	6.6	1.1	22.8	0.2

Table 8.	Estimated	Existing	Pollutant	Loads
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	Ν	Р	BOD	Sediment	Ν	Р	BOD	Sediment
Watershed	lb/yr	lb∕yr	lb/yr	t∕yr	lb∕ac-yr	lb/ac-yr	lb/ac-yr	t/ac-yr
Middle Tankerhoosen River (1570 ac)	9364	1473	34764	216	6.0	0.9	22.1	0.1
Railroad Brook (1203 ac)	1890	359	7451	40	1.6	0.3	6.2	0.0
Tucker Brook (934 ac)	4481	699	17014	118	4.8	0.7	18.2	0.1
Upper Tankerhoosen River (1472 ac)	3868	683	14562	82	2.6	0.5	9.9	0.1
Walker Reservoir (322 ac)	2312	390	7965	54	7.2	1.2	24.7	0.2
Total (8149 ac)	38960	6509	145286	903	4.8	0.8	17.8	0.1

- *Bolton Notch Pond.* Although this subwatershed is the second smallest in the study area, it is characterized by the second highest nitrogen loading rate, is tied for the highest phosphorus and sediment loading rate, and has the third highest BOD loading rate. These high values reflect the large composition of commercial land use (approximately 26%) and transportation land use (approximately 29%) in the subwatershed.
- *Gages Brook.* This watershed is characterized by both relatively high total pollutant loads and pollutant loading rates. This watershed is 70% urban land, and has the highest industrial land use composition and second-highest commercial land use composition.
- *Middle Tankerhoosen River.* This watershed has moderate pollutant loading rates. Although it is the largest subwatershed in the study area, it also has total pollutant loads that are approximately twice as high as those of other large subwatersheds.
- *Walker Reservoir*. Although the Walker Reservoir subwatershed is similar in size to the Bolton Notch Pond subwatershed, its pollutant loading rates for nitrogen, phosphorus, and sediment are significantly higher. These loading rates reflect the highly urbanized nature of this subwatershed, which also has the highest percentage of transportation land use.

5.3 Discussion

The sources of pollutants in the watershed are generally associated with urban land use, as presented in <u>Table 9</u>. Note that urban areas are estimated to account for between 80% and 95% of the NPS pollutant load in the watershed, although urban uses comprise only 59% of the total watershed land use area (See <u>Table 5</u>)

	N Load	P Load	BOD	Sediment
Source		F LUau	Load	Load
Urban	91.9%	81.5%	93.1%	88.6%
Cropland	1.9%	2.6%	1.0%	7.8%
Forest	2.3%	6.7%	1.5%	3.6%
Septic	3.9%	9.2%	4.3%	0.0%
Total	100.0%	100.0%	100.0%	100.0%

Table 9. Pollutant Source by Land Use

By subdividing the urban pollutant loads into the distinct urban categories that were included in the model (See <u>Table 10</u>), it is apparent that transportation land use accounts for the largest NPS pollutant loads in the watershed, with higher-density residential use being the second largest source of pollutant loads. Higher-density residential land use is a significant source since it is the predominant land use in the watershed (See <u>Table 6</u>). Transportation use is a significant source since it has the highest pollutant EMCs, and commercial uses are a significant source for the same reason (See <u>Table 1</u>).

Urban Land Use	N Load	P Load	BOD Load	Sediment Load	N Load	P Load	BOD Load	Sediment Load
03e	lb/year	lb/year	lb/year	tons/year	%	%	%	%
Commercial	2242	408	10191	51	6%	8%	8%	6%
Industrial	1898	304	6834	46	5%	6%	5%	6%
Institutional	1061	177	4596	20	3%	3%	3%	2%
Transportation	17400	2900	53938	435	49%	55%	40%	54%
Dense Residential	9890	989	45990	185	28%	19%	34%	23%
Rural Residential	2970	495	12871	55	8%	9%	10%	7%
Vacant	297	30	792	7	1%	1%	1%	1%
Open Space	39	4	103	1	0%	0%	0%	0%

Table 10.	Pollutant Loads a	nd Sources for	Urban Categories
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6.0 FUTURE POLLUTANT LOADINGS

6.1 <u>Input</u>

Future land use estimates, presented in <u>Table 11</u>, were used in the STEPL model to simulate a watershed buildout scenario. Also summarized in <u>Table 11</u> is the predicted "increase" in urban land use for each subwatershed. These model inputs were derived form the data presented in <u>Section 7.2</u> of the Baseline Watershed Assessment report. Much of the future developed area in the watershed is currently forested, such that the increase in urban area for each subwatershed includes a corresponding reduction in forested land.

	Lan	Land Use Area (ac)			Land Use Composition)			
Watershed	Urban	Cropland	Forest	Urban	Cropland	Forest	Increase	
Bolton Notch Pond	233.3	0	85.3	73%	0%	27%	15%	
Clarks Brook	590.4	2.4	54.6	91%	0%	8%	9%	
Gages Brook	614.4	28.2	52.9	88%	4%	8%	19%	
Gages Brook South Tributary	614.3	5.7	60.3	90%	1%	9%	18%	
Lower Tankerhoosen River	270.7	0	35.8	88%	0%	12%	30%	
Middle Tankerhoosen River	1312.5	10.1	247.9	84%	1%	16%	8%	
Railroad Brook	589.9	0	612.9	49%	0%	51%	18%	
Tucker Brook	771.2	43.0	119.3	83%	5%	13%	13%	
Upper Tankerhoosen River	746.1	0	725.7	51%	0%	49%	15%	
Walker Reservoir	296.4	0	25.7	92%	0%	8%	32%	

Table 11. Land Use Input Data

<u>Table 12</u> summarizes a break-down of the urban land uses presented in <u>Table 5</u>. Much of the future development and redevelopment is anticipated in areas that are currently zoned for residential uses. As such, residential land use is likely to become a larger percentage of urban land use in many of the subwatersheds.

			Urban	Land Use	Composi	tion (%)		
Watershed	Com.	Ind.	Inst.	Trans.	Dense Res.	Rural Res.	Vacant	Open Space
Bolton Notch Pond	20.2	6.5	4.5	23.2	16.0	26.6	3.1	0.0
Clarks Brook	6.0	15.2	0.3	12.6	57.1	7.6	1.3	0.0
Gages Brook	15.6	16.8	7.0	6.1	23.2	30.8	0.0	0.5
Gages Brook South Tributary	2.6	3.5	3.2	15.7	30.3	44.2	0.5	0.0
Lower Tankerhoosen River	3.5	2.7	6.5	21.6	59.8	2.8	1.3	1.6
Middle Tankerhoosen River	5.9	1.7	1.6	16.1	67.5	6.0	0.9	0.4
Railroad Brook	0.0	0.0	0.0	2.9	86.1	10.1	0.9	0.0
Tucker Brook	0.2	0.0	3.8	10.0	81.5	4.4	0.1	0.0
Upper Tankerhoosen River	0.0	0.0	0.5	9.5	33.9	55.0	0.9	0.3
Walker Reservoir	15.1	3.7	0.0	24.5	36.9	19.8	0.1	0.0

Table 12. Urban Land Use Composition

<u>Table 13</u> presents the total estimated number of existing and future septic systems in the Tankerhoosen River watershed, determined using the methods described in <u>Section 4.0</u>. Septic systems are assumed to be present at lots not included in or abutting the sewer service area shown in the Baseline Watershed Assessment report. As discussed in <u>Section 4.0</u>, "other" septic systems includes septic systems for land uses other than single-family and multi-family residential land uses, such as condominiums, group quarters, commercial, industrial parcels. These systems are assumed to serve an equivalent population of 5 times a residential system on average.

	Existing	Future	Other	Future
	Equivalent	Residential	Future	Equivalent
Watershed	Total	Systems	Systems	Total
Bolton Notch Pond	53	8		61
Clarks Brook	148	3	9	196
Gages Brook	86	5		91
Gages Brook South Tributary	256	14	1	275
Lower Tankerhoosen River	48	4		52
Middle Tankerhoosen River	204	11	9	260
Railroad Brook	76	26		102
Tucker Brook	98	6		104
Upper Tankerhoosen River	213	19		232
Walker Reservoir	52	7	1	64

Table 13. Estimated Number of Septic Systems

6.2 <u>Results</u>

<u>Table 14</u> presents projected future pollutant loads under a watershed buildout scenario. An increase in pollutant loads is predicted in all subwatersheds. The Railroad Brook subwatershed is predicted to have the highest increase in nitrogen, BOD, and sediment loads. Large increases are also predicted in nitrogen, phosphorus, and BOD in the Middle Tankerhoosen River subwatershed. The largest phosphorus increases are predicted in the Gages Brook subwatershed.

		Total I	- uture Loa	d	Projected Load Increase			
	N	Р	BOD	Sediment	N	Р	BOD	Sediment
Watershed	lb/yr	lb/yr	lb/yr	t∕yr	lb/yr	lb/yr	lb/yr	t∕yr
Bolton Notch Pond (318 ac)	2384	416	8752	54	209	31	857	4
Clarks Brook (647 ac)	4745	756	18205	103	588	87	2519	11
Gages Brook (695 ac)	5538	921	21973	134	898	134	3888	19
Gages Brook South Tributary (680 ac)	4559	793	16976	98	497	73	2099	9
Lower Tankerhoosen River (306 ac)	2410	374	8916	53	401	31	1929	7
Middle Tankerhoosen River (1570 ac)	10357	1585	39700	229	993	112	4936	13
Railroad Brook (1203 ac)	2964	432	12652	59	1074	73	5201	19
Tucker Brook (934 ac)	5111	736	20084	129	630	37	3071	11
Upper Tankerhoosen River (1472 ac)	4228	759	16194	87	360	76	1632	5
Walker Reservoir (322 ac)	2909	481	10718	66	598	91	2754	12
Total (8149 ac)	45207	7252	174172	1011	6248	743	28886	109

Table 14. Projected Future Pollutant Loads and Load Increases

<u>Table 15</u> presents the projected future pollutant loads in terms of the projected load increase based on existing loads (percent increase) and loading rate increase for each subwatershed. These criteria were selected to determine the most significant changes in watershed loadings since they control for the existing load quantities (percent increase) and watershed size (rate increase). The highlighting in <u>Table 15</u> identifies areas with the high (orange), moderate (yellow), and low (green) pollutant loadings or loading rates in the Tankerhoosen River watershed.

Table 15. Projected Pollutant Loading Rate Increases and Load Increases

	Projecte	ed Future Lo	bading Rate	Increase	Projected Load Increase			
	N	Р	BOD	Sediment	Ν	Р	BOD	Sediment
Watershed	lb/ac-yr	lb/ac-yr	lb/ac-yr	lb/ac-yr	lb/yr	lb/yr	lb/yr	t/yr
Bolton Notch Pond (318 ac)	0.66	0.10	2.7	0.012	9.6%	8.0%	10.9%	7.7%
Clarks Brook (647 ac)	0.91	0.13	3.9	0.017	14.1%	12.9%	16.1%	11.7%
Gages Brook (695 ac)	1.29	0.19	5.6	0.027	19.4%	17.0%	21.5%	16.7%
Gages Brook South Tributary (680 ac)	0.73	0.11	3.1	0.014	12.2%	10.2%	14.1%	10.5%
Lower Tankerhoosen River (306 ac)	1.31	0.10	6.3	0.022	20.0%	8.9%	27.6%	14.7%
Middle Tankerhoosen River (1570 ac)	0.63	0.07	3.1	0.008	10.6%	7.6%	14.2%	5.8%
Railroad Brook (1203 ac)	0.89	0.06	4.3	0.015	56.8%	20.3%	69.8%	46.4%
Tucker Brook (934 ac)	0.67	0.04	3.3	0.012	14.1%	5.3%	18.0%	9.4%



	Projecte	Projected Future Loading Rate IncreaseNPBODSediment				Projected Load Increase			
	N					Р	BOD	Sediment	
Watershed	lb/ac-yr	lb/ac-yr	lb/ac-yr	lb/ac-yr	lb/yr	lb/yr	lb/yr	t/yr	
Upper Tankerhoosen River (1472 ac)	River 0.24 0.05		1.1	1.1 0.003		11.1%	11.2%	6.0%	
Walker Reservoir (322 ac)	1.86	0.28	8.6	0.036	25.8%	23.3%	34.6%	21.6%	
Total (8149 ac)	0.77	0.09	3.5	0.013	16.0%	11.4%	19.9%	12.0%	

Several of the subwatersheds are predicted to experience significantly higher increases in pollutant loads and loading rates under a watershed buildout scenario. These include:

- *Gages Brook.* The existing conditions pollutant load model indicates that this subwatershed is characterized by both relatively high total pollutant loads and pollutant loading rates, with approximately 70% urban land use, the largest amount of industrial land use, and the second-highest commercial land use composition in the entire watershed. The buildout condition of this watershed is projected to result in a 19% increase in urban land use with a corresponding decrease in forest; and the new urban land is likely to consist of new residential and industrial development. As such, relatively large loads and loading rate increases may occur.
- Lower Tankerhoosen River. The existing conditions pollutant load model for this subwatershed predicts relatively small loads (since the watershed area is small) and moderate loading rates. Under a buildout scenario, this subwatershed is projected to result in more than a 20% increase in nitrogen and BOD loads. The resulting loading rates for these parameters are projected to be the second highest of the Tankerhoosen River subwatersheds.
- *Railroad Brook.* The projected buildout pollutant loadings in this subwatershed for nitrogen and BOD are anticipated to increase by approximately 57% and 70%, respectively. Significant increases are also anticipated in phosphorus and sediment loads. Currently, the Railroad Brook sub watershed is heavily forested, with comparatively little development. Several large tracts of land within this subwatershed are potentially available for future development, especially in Bolton and South Vernon, which makes this watershed vulnerable to potentially significant pollutant load increases.
- *Walker Reservoir.* The existing conditions pollutant loading model suggests that this subwatershed has some of the highest levels of pollutant loads within the overall Tankerhoosen River watershed. Potential land use changes in this subwatershed include significant areas of new residential and mixed-use development, much of which is located adjacent to Walker Reservoir. These changes are predicted to result in the greatest increases in pollutant loading rates for all of the parameters evaluated.

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Watershed Field Inventories and Land Use Regulatory Review Tankerhoosen River Watershed

> Friends of the Hockanum River Linear Park of Vernon, Inc.

> > In Association With:

Town of Vernon North Central Conservation District Rivers Alliance of Connecticut Hockanum River Watershed Association Belding Wildlife Management Area

Vernon, CT

October 2008



Fuss & O'Neill, Inc. 78 Interstate Drive West Springfield, MA 01089



WATERSHED FIELD INVENTORIES AND LAND USE REGULATORY REVIEW Tankerhoosen River Watershed

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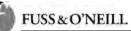
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1.0 INTRODUCTION

The Friends of the Hockanum River Linear Park of Vernon, Inc. (the "Friends") has retained Fuss & O'Neill to prepare a Watershed Management Plan for the Tankerhoosen River watershed. The Watershed Management Plan will be developed through a collaborative effort with a Technical Advisory Committee consisting of the Friends, the Town of Vernon (Planning Department and Conservation Commission), the North Central Conservation District, the Hockanum River Watershed Association, Rivers Alliance of Connecticut, and the Belding Wildlife Trust. The Plan will identify action items to be implemented by the municipalities and private groups which will protect and improve the health of the Tankerhoosen River watershed.

There are two key reports that provide the basis for recommendations in the Watershed Management Plan: 1) Baseline Watershed Assessment and 2) Watershed Field Inventories and Regulatory Review. The Baseline Watershed Assessment (Fuss & O'Neill, May 2008) evaluates the existing conditions of natural resources and pollutant sources in the watershed to prioritize watershed protection and restoration strategies. This report, the Watershed Field Inventories and Land Use Regulatory Review, describes the stream corridor and upland assessments conducted by Fuss & O'Neill to identify and evaluate pollutant sources in the watershed, as well as, review of local zoning and land use regulations for selected towns within the Tankerhoosen River watershed. Findings of the Baseline Watershed Assessment and the Watershed Field Assessment and Land Use Regulatory Review will serve as the basis for development of a watershed management plan for the Tankerhoosen River.

2.0 WATERSHED FIELD INVENTORIES

Field inventories were performed during summer 2008 to further assess existing watershed conditions and potential sources of pollution. The field inventories are screening level tools for locating potential pollutant sources and environmental problems in a watershed along with possible locations where restoration opportunities and mitigation measures can be implemented. The field inventories included selected stream corridors and upland areas within priority subwatersheds, which were identified in the Baseline Watershed Assessment report based on a comparative subwatershed evaluation that considered vulnerability to future development impacts and restoration potential to improve upon existing conditions. Field inventories were performed within the following priority subwatersheds (<u>Figure 1</u>):

- Clarks Brook,
- Gages Brook,
- Gages Brook South Tributary,
- Lower Tankerhoosen River,
- Middle Tankerhoosen River,
- Tucker Brook,
- Walker Reservoir.

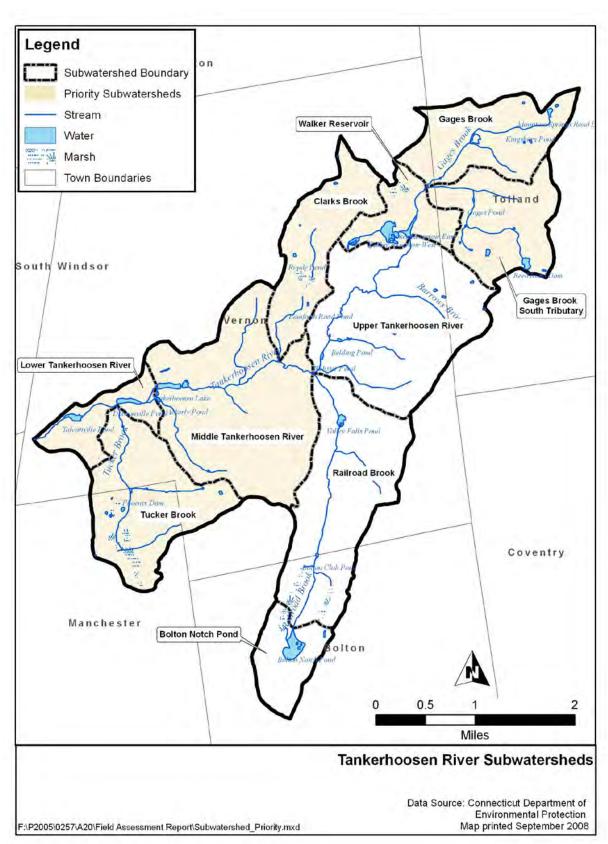
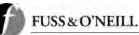


Figure 1. Tankerhoosen River Watershed

FUSS&O'NEILL



The stream corridor assessment procedure used in this study is adapted from the U.S. EPA Rapid Bioassessment (RBA) protocol (EPA, 1999) and the Center for Watershed Protection's Unified Stream Assessment (USA) method (CWP, 2005). Upland areas and activities that may impact stream quality were also assessed using methods adapted from the Center for Watershed Protection's Unified Subwatershed and Site Reconnaissance (USSR) techniques (CWP, 2005). The upland assessments included inventories of selected representative residential neighborhoods, streets and storm drainage systems, and land uses with higher potential pollutant loads (i.e., "hotspot" land uses). Field assessment efforts were targeted on stream segments and upland areas with the greatest potential for direct impacts to the streams. These areas were identified through aerial and land use mapping. To the extent possible, efforts were also focused on publicly-owned land, which typically offers greater opportunities for retrofits and mitigation projects as opposed to privately-owned land.

During the field inventories, crews assessed approximately 8.7 miles of stream corridors, six potential hotspot locations, five representative residential neighborhoods, and a number of streets and storm drainage systems associated with the residential neighborhoods and hotspot land uses. Field inventory nomenclature used throughout this report is summarized in <u>Table 1</u>. Copies of completed field assessment forms are provided in <u>Appendix A</u> (stream corridor assessments) and <u>Appendix B</u> (upland assessments). Photographs of specific or representative pollutant sources and problem areas are included throughout this document for illustrative purposes. All of the photographs taken during the field inventories are included on a CD in <u>Appendix C</u>.

Subwatershed	Abbreviation
Clarks Brook	СВ
Lower Tankerhoosen River	LTR
Middle Tankerhoosen River	MTR
Walker Reservoir	WR
Gages Brook	GB
Gages Brook South Tributary	GBST
Tucker Brook	TB
Stream Corridor Assessment	Abbreviation
Reach Level Assessment	RCH
Channel Modification	CM
Severe Bank Erosion	ER
Impacted Buffer	IB
Stormwater Outfall	OT
Stream Crossing	SC
Trash & Debris	TB
Utilities	UT
Upland Assessment	Abbreviation
Hotspot Investigation	HSI
Neighborhood Site Assessment	NSA
Streets and Storm Drains	SSD

2.1 <u>Summary of Findings</u>

A variety of common issues and problems were identified during the field inventories. Some prevalent issues throughout the watershed are described below. These findings will be used to develop recommendations for the Watershed Management Plan.

- Overall in-stream habitat in the assessed reaches was mixed. Some of the assessed reaches have high quality habitat, with riparian cover, good floodplain connection, varied substrate, and significant stream shading. In other segments, in-stream habitat is marginal to poor due to bank erosion, buffer encroachment, trash and debris, lack of shading, and in-stream sedimentation. However, the majority of the stream reaches assessed appear to be either supporting biological communities (fish, frogs, birds, etc.) or sufficient to support such communities. Many potential barriers to fish passage were observed throughout the watershed, including perched culverts, culverts with very shallow flow, and natural and manmade dams. Therefore, the impact of potential fish barriers and the feasibility of fish barrier removal efforts should be investigated further.
- Stream buffer encroachments are prevalent along stream corridors in or near areas of
 residential and commercial development. Residential lawns and some commercial lawns
 extend down to the banks of the stream in many areas, particularly in residential back
 yards. Yard waste such as grass clippings, leaves, and brush and waste materials were
 also common occurrences in and near these areas where easy access exists to the
 streams. Education, signage, stream buffer regulations, and stream cleanups are
 potential approaches for improving buffer management.
- Residential areas appear to contribute significant quantities of rooftop runoff to the storm drainage system, particularly in medium and high-density residential neighborhoods with smaller yards. Many small outfall pipes were observed from the backyards of residential areas, which are presumably associated with foundation drains, yard drains, or roof downspouts. Opportunities exist to disconnect residential rooftop runoff from the storm drainage system and reduce the quantity of runoff by redirecting the runoff to pervious areas or through the use of rain barrels or rain gardens.
- Numerous outfalls were observed from virtually all of the land uses encountered during the stream assessments. Many appear to be associated with sources having low potential for water quality impacts (i.e., residential foundation drains), while others were of unknown origin and should be the focus of future investigation. A watershed-wide illicit discharge investigation is recommended in targeted areas and land uses.
- Invasive species (phragmites, cattails, reed canary grass, etc.) were observed in stream corridors in many areas of the watershed. Invasive species management should be incorporated into stream corridor restoration activities.
- Parking lots associated with apartment complexes, institutional land uses (schools), and commuter lots are potential candidates for stormwater retrofits to reduce site runoff and improve water quality through the use of bioretention, water quality swales, buffer strips/level spreaders, and other small-scale LID approaches.



- The field assessments identified very little evidence of storm drain stenciling or watershed stewardship signage, with the exception of a residential subdivision in the Tucker Brook subwatershed.
- Most of the developed areas surveyed have inadequate stormwater quality controls. Many of the residential developments were constructed prior to the advent of modern stormwater quality regulations and design requirements. Therefore, most of the development observed in the watershed employs traditional curb and gutter storm drainage collection systems with little, if any, stormwater management beyond detention basins for peak flow control. In most cases, the stormwater management controls that were observed at newer developments were not being maintained.
- No Low Impact Development (LID) design practices were observed in the watershed. With the recent shift toward LID site design and stormwater management requirements, as demonstrated by the Town of Tolland's new LID regulations and design manual, the watershed is an ideal candidate to showcase LID practices for both new development and retrofit applications. Local LID demonstration sites are a valuable tool for public education and promoting the widespread use of such practices. Incorporating LID into town projects, including roadway projects, can also serve as a proactive model for private development.
- Stormwater runoff from Interstate 84, other state roads such as Route 30 and 31, and local roads typically receives little or no treatment prior to discharge. Such discharges are a source of sediment and other pollutants to the receiving water bodies.
 Opportunities exist for stormwater retrofits at roadway stormwater outfalls
- Relatively isolated areas of moderate to severe streambank erosion were observed throughout the assessed portions of the watershed. Most of these areas are located at or downstream of stormwater outfalls in developed areas of the watershed. Access to many of these areas is limited; therefore, potential candidate sites for bank stabilization projects should be evaluated further for overall feasibility.
- Very few active construction sites were observed in the watershed. However, a large
 amount of developable land exists in the watershed, and future construction activity is a
 major potential source of polluted runoff. Approaches for stronger soil erosion and
 sedimentation controls include regulating building envelopes, encouraging property
 owners to minimize clearing for other purposes, and requiring drainage review for
 activities that disturb less than ½ acre.
- Due to limited project funding, not all stream segments in the priority subwatersheds were assessed, and other subwatersheds (Railroad Brook, Bolton Notch Pond, and Upper Tankerhoosen River) were not assessed as they were determined to be less vulnerable to future development impacts. A schedule should be established for assessing the remaining stream segments and subwatersheds.

The following sections present a more detailed discussion of the stream corridor and upland assessment methods and findings.

2.2 <u>Stream Corridor Assessment</u>

Stream corridors within the Tankerhoosen River watershed were assessed during June 3 through 6, 2008, and on July 2 and 10, 2008. The weather on these days was sunny, overcast or partly cloudy and not raining, with the exception of June 4, which had intermittent and heavy rain at times. Field crews consisted of staff from Fuss & O'Neill, the North Central Conservation District, and volunteers with Friends of the Hockanum River Linear Park of Vernon. Stream corridors were assessed along selected reaches within priority subwatersheds using methods adapted from the U.S. EPA Rapid Bioassessment (RBA) protocol (EPA, 1999) and the Center for Watershed Protection's Unified Stream Assessment (USA) (CWP, 2005).

The stream assessment method used in this study is a continuous stream walk method that identifies and evaluates the following impact conditions for each reach:

- Outfalls (OT), including stormwater and other manmade point discharges;
- Severe Bank Erosion (ER), such as bank sloughing, active widening, and incision;
- Impacted Buffer (IB), which is a narrowing or lack of natural vegetation;
- Utilities in the stream corridor (UT), such as leaking or exposed pipes;
- Trash and Debris (TR), such as drums, yard waste, and other illegal dumping;
- Stream Crossings (SC), which are hard objects, whether natural or artificial, that restrict or constrain the flow of water. These may include bridges, culverts, dams, and falls;
- Channel Modification (CM), where the stream bottom, banks, or direction have been modified;
- Miscellaneous (MI), other impacts or features not otherwise covered; and
- Reach Level Assessment (RCH), the average characteristics of each reach.

The stream assessment method also includes a semi-quantitative scoring system as part of the reach level assessment to evaluate the overall condition of the stream, riparian buffer, and floodplain, based on a consideration of in-stream habitat, vegetative protection, bank erosion, floodplain connection, vegetated buffer width, floodplain vegetation and habitat, and floodplain encroachment.

Field data forms were completed for each stream reach assessed (<u>Appendix A</u>). The information was entered into a database and used to quantify the overall condition of stream corridors in the watershed, compare subwatersheds within the watershed to each other, and prioritize areas for restoration, stormwater retrofit, land preservation, and other stewardship opportunities.

Stream reaches were assigned a subwatershed abbreviation followed by a two-digit numerical identifier. Reaches were generally numbered sequentially from downstream to upstream when in series and west to east upstream from confluences. A reach was considered to be a stream segment with relatively consistent geomorphology and surrounding land use, and generally less than one-half mile in length. Features noted at reach junctions (e.g., culvert crossings) were associated with the downstream reach. Impact conditions within each reach were numbered sequentially with an abbreviation followed by a two-digit number. For example, the second stream crossing in a reach would have the identifier SC-02.

Forty-one stream reaches were evaluated in the Tankerhoosen River watershed using this stream assessment protocol. <u>Table 2</u> summarizes the number of impact conditions identified and reach level assessments that were performed within each subwatershed.

Table 2: Number of Reach Level Assessments Performed and Impact Conditions Identified

Subwatershed	RCH	СМ	ER	IB	OT	SC	TD	UT
Clarks Brook	5		2		10	8	2	
Lower Tankerhoosen River	1				1	1		
Middle Tankerhoosen River	5		1		14	5	7	
Walker Reservoir	5				6	6		
Gages Brook	12	1	8	5	21	12	3	1
Gages Brook South Trib.	7	1	1	1	3	8		
Tucker Brook	6		2	4	9	9	3	

Reach level assessment scores were assigned by field crews based upon the overall stream, buffer, and floodplain conditions. A subjective determination of eight criteria is assessed on a scale of 0 to 20; 0 relating to poor conditions and 20 being optimal conditions. The total of these scores provides a quantitative index of overall stream health and condition. The maximum possible number of points that would be assigned for a fully optimal stream reach is 160 points.

Streams were assessed relative to a base condition, which for this study, is the highest scoring stream reach in the Tankerhoosen River watershed (153 points). All other assessed stream reaches were assigned a numerical score and categorized relative to the base score of 153 points (<u>Table 3</u>). Reaches scoring greater than 90% of the base condition (138 points) are considered "excellent", between 75% and 90% of the base condition are categorized as "good", between 55% and 75% of the base condition are categorized as "fair", between 35% and 55% of the base condition are categorized as "poor", and less than 35% of the base condition are categorized as "very poor". <u>Table 4</u> summarizes stream reach assessment scores and classifications for the assessed stream reaches.

		Point
Category	Percentile	Threshold
Excellent	90%	≥138
Good	75%	≥115
Fair	55%	≥84
Poor	35%	≥54
Very Poor	<35%	<54

Table 3: Stream Reach Classifications

Excellent		Good		Fair		Poor		Very Poor	
Reach ID	Score	Reach ID	Score	Reach ID	Score	Reach ID	Score	Reach ID	Score
MTR-08	153	GBST-02	127	GB-09	114	TB-04B	83	GB-05B	53
GB-10	146	GB-02	120	GBST-03	111	MTR-01	82	WR-01	35
GBST-04A	146	GBST-09B	120	LTR-03	111	GB-04	80		
GBST-01	145	TB-02	119	GB-07	105	WR-02	80		
MTR-07	139	GBST-04B	117	CB-03	104	WR-04	76		
CB-04	138	TB-01	116	GB-01	102	GB-03B	72		
		GB-08	115	GB-03A	97	GBST-09A	59		
				MTR-09	94				
				GB-05A	93				
				CB-02	93				
				TB-03	92				
				TB-04A	92				
				WR-03	91				
				GB-06	88				
				MTR-02	87				
				CB-01	85				
				WR-05	84				
Note: TB04C and CB-05 were not scored during the reach level assessment									

Table 4: Stream Reach Assessment Scores and Classifications

As depicted in <u>Figure 2</u>, MTR-08 is the highest rated stream reach due to good riparian cover and bed material. WR-03 is considered fair due to the presence of invasive species within the riparian corridor. TB-04B and GB-05B are poor and very poor, respectively, because of poor channel characteristics, outfalls, stream crossings, trash and debris and lack of stream buffer and stream bank erosion in the case of GB-05B.

The following sections summarize the major issues identified during the stream corridor assessments for each priority subwatershed. Specific locations are identified according to the stream reach and impact condition IDs described previously. Identification of "right" and "left" stream banks is from the observer's perspective facing downstream.



Figure 2: Examples of Stream Reaches in Various Classification Categories

2.2.1 Clarks Brook

Clarks Brook is a tributary of the Tankerhoosen River that flows into the Middle Tankerhoosen River subwatershed. Clarks Brook is divided into five stream segments, labeled CB-01 through CB-05 (Figure 3). All five stream segments were assessed. Segments CB-01 through CB-03 were inventoried on July 2, 2008, while segments CB-04 and CB-05 were assessed on July 10, 2008. Land use in this subwatershed includes residential, commercial/industrial, retail, and some undeveloped land. Interstate 84 crosses Clarks Brook in the southern portion of the watershed.

CB-01

Stream segment CB-01 begins at the mouth of Clarks Brook and continues upstream to Bolton Road. The surrounding land use is primarily forested and open fields, with one residence along the left bank.

 RCH — The overall stream conditions are optimal to suboptimal with the exception of bank vegetative protection which is rated as poor due to lack of stream buffer along portions of the left bank. The dominant bed substrate is cobble; there are no attached or floating plants in the stream; wildlife such as fish, frogs, and birds are present; and the stream is approximately 50 percent shaded. The reach has good accessibility.

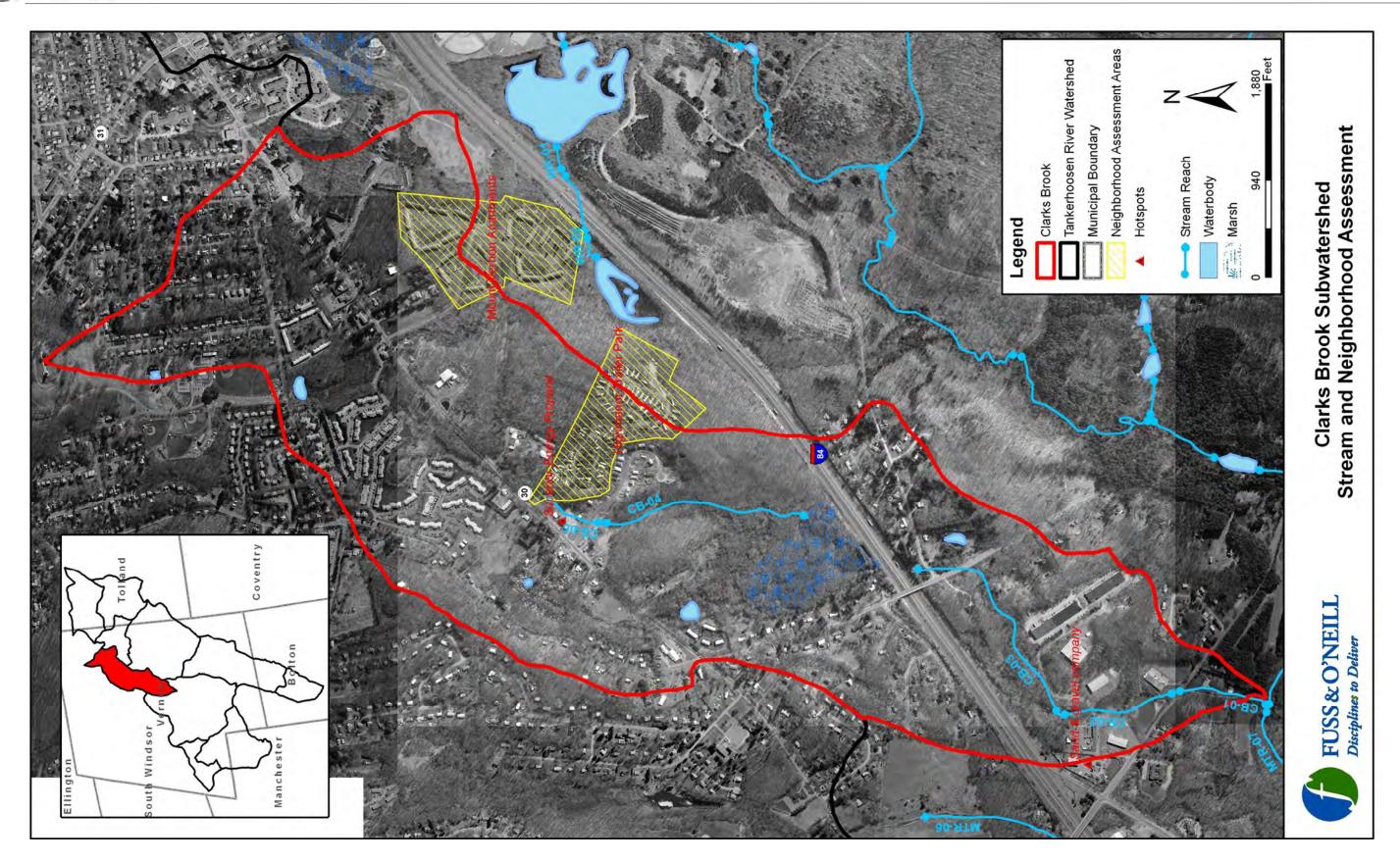


Figure 3. Clarks Brook Subwatershed Field Assessment Locations



- OT The reach contains several outfall pipes, including several 4-inch plastic pipes which are believed to be connected to residential foundation drains or roof downspouts (no dry weather flows observed) and two 18-inch outfalls conveying roadway drainage (no dry weather flows observed). None of the observed outfall pipes appears to be contributing dry weather discharges or causing stream bank erosion.
- SC Clarks Brook crosses under Bolton Road within a 5.5-foot circular concrete culvert. The upstream side of the culvert was partially blocked by brush and debris, and the concrete on the inside of the culvert is deteriorating. The sharp drop in elevation immediately downstream of the culvert creates a "perched" condition and a physical barrier to fish passage. This culvert is a potential candidate for fish barrier removal to address the perched outlet and cleaning/repair.

CB-02

Stream segment CB-02 flows along a baseball field and industrial properties, from Bolton Road to Industrial Park Road. The stream enters a culvert prior to Industrial Park Road and reemerges on the other side of the road.

- RCH The stream conditions are generally suboptimal to marginal. The instream habitat is considered optimal while the floodplain connection, vegetated buffer width, floodplain habitat and floodplain encroachment received a marginal rating. Clarks Brook flows at 100 percent of the channel width in this section, with clear water and some attached plants in the stream. The dominant substrate is sand and cobble and there is evidence of sediment deposition.
- OT There are three outfalls along this reach. The first, OT-01, is a plastic pipe on the right bank originating from the parking lot of an adjacent industrial facility, was observed to have a trickle of discharge and brown benthic growth on the pipe. Outfall OT-02 is an earthen open channel approximately 4 feet deep and 5 feet wide. A trickle of discharge was also observed in the channel. The final outfall, OT-03, is a 4-inch diameter plastic pipe on the right back. No flow or microbial growth/discoloration was observed from the pipe.
- ER Some moderate, isolated bank erosion was observed on the left bank. This area is a potential candidate for bank stabilization.
- SC An approximately 400-foot long circular culvert conveys Clarks Brook under a parking lot. The triple barrel metal culverts are 2 feet in diameter. The outlets of the culverts are perched slightly above elevation of the stream bottom. This culvert is a potential candidate for fish barrier removal to address the perched outlet.
- TR Significant quantities of trash and debris (an estimated 1 pickup truck load) were
 observed including tires, automotive waste, appliances and a closed 55-gallon drum of
 unknown contents. The debris and waste materials should be removed and
 disposed in accordance with applicable local, state, and federal regulations.



Trash and debris along reach CB-02

СВ-03

Reach CB-03 begins on the north side of Industrial Park Road, continues through the underpass of Bamforth and Baker Roads, and ends at Interstate 84. The stream passes through mostly forested areas, although the stream also flows along an industrial park for a short distance and then under the two roads.

- RCH The stream conditions are generally rated suboptimal. The in-stream habitat
 and floodplain vegetation are rated optimal. The vegetative protection, bank erosion,
 floodplain connection, habitat and encroachment are considered suboptimal. The bank
 erosion on the left bank and buffer width on the right bank are considered marginal.
 The stream flows at 75-100% of the channel width, which is dominated by boulder
 substrate. The water is clear with no aquatic plants in the stream, and the stream
 surface is mostly shaded. Access to the reach is rated fair or difficult.
- OT There are two outfalls along this reach. OT-01 is a drainage channel, originating from a wooded area adjacent to Interstate 84, approximately 1 foot deep and 2 feet wide. OT-02 is an 18-inch concrete drainage outfall pipe with moderate flow.
- ER An approximately 30-foot long area of severe bank erosion was observed on the left bank downstream of a wooden foot bridge. The area has good access for construction equipment for potential restoration of the bank. This area is a potential candidate for bank stabilization.
- SC —Stream crossing SC-01 is a wooden foot bridge over Clarks Brook. Debris under the bridge is causing partial blockage of the stream. Removal of the debris is recommended. Crossing SC-02 is a circular culvert below Bamforth Road. The double metal barrels are approximately 4.5 feet in diameter and 60 feet long. The culvert outlet is elevated above the elevation of the stream bed, restricting fish passage. This culvert is a potential candidate for fish barrier removal to address the perched outlet. The third stream crossing in this segment is SC-03, which conveys flow underneath



Baker Road inside a circular double barrel metal culvert. The culverts are 4 feet in diameter and approximately 100 feet in length.



Bamforth Road crossing (perched culvert) along reach CB-03

• TR – Automotive debris was observed along the stream near a residential area, and should be removed as part of a stream cleanup in this reach.

CB-04

Stream segment CB-04 extends from the wetlands on the northern side of Interstate 84 through a forested area and ending at the edge of a residential neighborhood at Rockledge Drive.

- RCH This segment is rated as optimal using the stream assessment criteria in every category except floodplain habitat, which is rated suboptimal. The dominant substrate is cobble, the water is clear and there are no aquatic plants in the stream. There is evidence of fish, frogs and songbirds and the stream is mostly shaded. There is some evidence of sediment deposition in the stream channel.
- OT —A 12-inch concrete outfall pipe is located on the right bank near Rockledge Drive. The pipe is surrounded by dense knotweed and appears to originate from the adjacent residential area. A trickle of flow was observed, and the flow appeared to be cloudy and orange in color.
- SC There are several stream crossings along Clarks Brook in this segment. The first
 two crossings consist of a low-head concrete dam located immediately upstream of an
 approximately 4-foot diameter concrete culvert, which is located below a forested dirt
 road. The concrete dam and forest road culvert (perched approximately 3 to 4 inches
 above the elevation of the streambed at the culvert outlet, and having very shallow
 flow) are potential barriers to fish passage. Both are potential candidates for fish
 barrier removal. The third crossing is a concrete culvert below Rockledge Drive. Both
 culverts identified in this reach showed evidence of cracking and deterioration, and
 should be evaluated for potential repair or replacement.



CB-05

The most upland reach in Clarks Brook, CB-05, could not be visually assessed because the segment flows entirely belowground in a culvert system. The flow is directed below a commercial building occupied by Superior Energy Propane and continues to flow through the culvert for approximately 650 feet, parallel to Route 30 until re-emerging on the north side of Middle Terrace. Historical filling of the Superior Propane site appears to have occurred, as evidenced by water seepage from the ground surface at the southeast corner of the site and the presence of a significant stand of phragmites adjacent to the site. A storm drain exists on the site. Representatives from Superior Propane indicated a desire to pave additional areas of the site and/or divert the water on the site to alleviate the wet soil conditions. This site should be further investigated to better define potential impacts of the historical filling, current drainage issues, and plans for additional site development.

2.2.2 Lower Tankerhoosen River

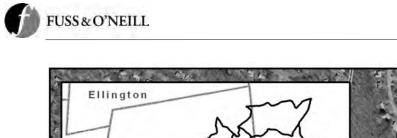
The Lower Tankerhoosen River subwatershed is the outlet for the main stem of the Tankerhoosen River prior to its confluence with the Hockanum River and is fed directly by Tucker Brook and the Middle Tankerhoosen River (Figure 4). Only stream segment LTR-03 was assessed in this subwatershed (on June 5, 2008) due to limited time and staff availability.

LTR-03

Stream segment LTR-03 is approximately 0.5 mile long and extends east to west, parallel to Interstate 84, from the inlet to Talcottville Pond through a forested area to the Dobsonville Pond dam and Dobson Road. The width of the stream varies from 20 feet to 50 feet and the upstream end of the segment near the dam has very steep banks.



The upstream side of Dobsonville Pond dam at the upstream limit of reach LTR-03. The photograph is taken near the confluence with reach TB-01.



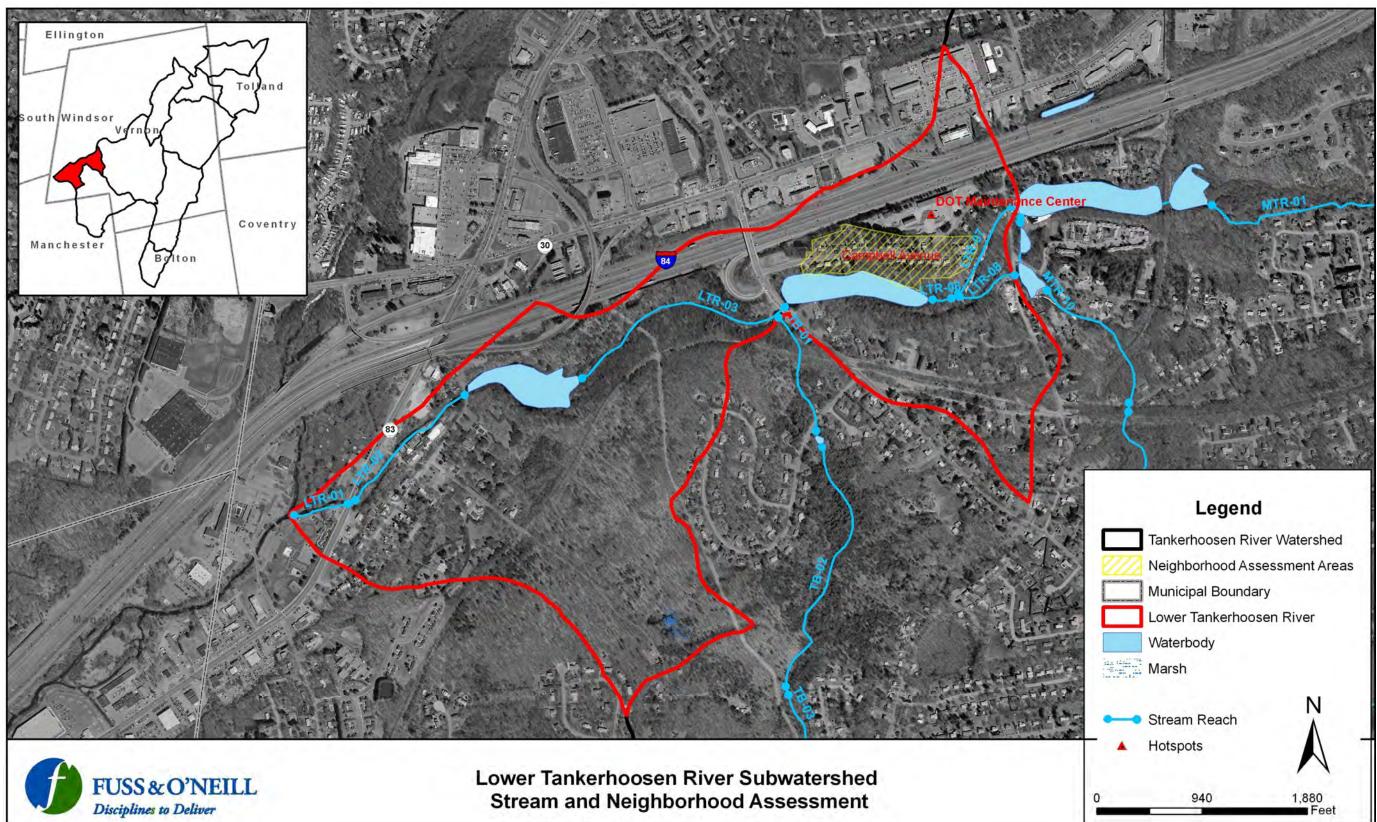


Figure 4. Lower Tankerhoosen River Subwatershed Field Assessment Locations



- RCH The reach level assessment characterized this segment as generally suboptimal. The vegetated buffer width and floodplain vegetation is rated as optimal. The surrounding forested land provides good stream habitat. The beginning and end of the stream segment are altered by the manmade impoundments at both ends. The stream flows at 75 to 100% of the channel width and the substrate is dominated by cobble. The water is somewhat cloudy and has a naturally stained color. There are no plants in the stream and the surface is mostly shaded. The most significant issue observed along this reach is a stormwater detention basin associated with runoff from Interstate 84.
- OT —A stormwater outfall pipe conveys stormwater runoff from Interstate 84 to a
 detention basin located adjacent to the stream. The inside of the outfall pipe was
 observed to have an orange, rusty color, and an oily stain. A rusty, oily sludge was
 observed in the bottom of the detention basin. No standing water or discharge from
 the basin was observed at the time of the inspection. A discharge investigation is
 recommended to observe the basin function during wet weather and assess possible
 pollutant contribution to the stream. The basin and stormwater discharge is a
 potential stormwater retrofit candidate.
- SC The dams that impound Dobsonville Pond and Talcotville Pond are potential barriers to fish passage. According to the CTDEP Inland Fisheries Division, there are currently no diadromous fish (herring, shad) passage plans for these dams (Murphy, personal communication, September 24, 2008). There has been an effort in recent years to provide American eel passage at inland dams when there is a need and opportunity. An assessment of the lower reaches of the Tankerhoosen River is recommended to evaluate the presence of American eel and other resident fish populations, as well as the potential benefit of providing fish passage for these dams. Based on the assessment findings, fish passage for the resident fish population in the lower Tankerhoosen River could be incorporated into future dam repair projects.

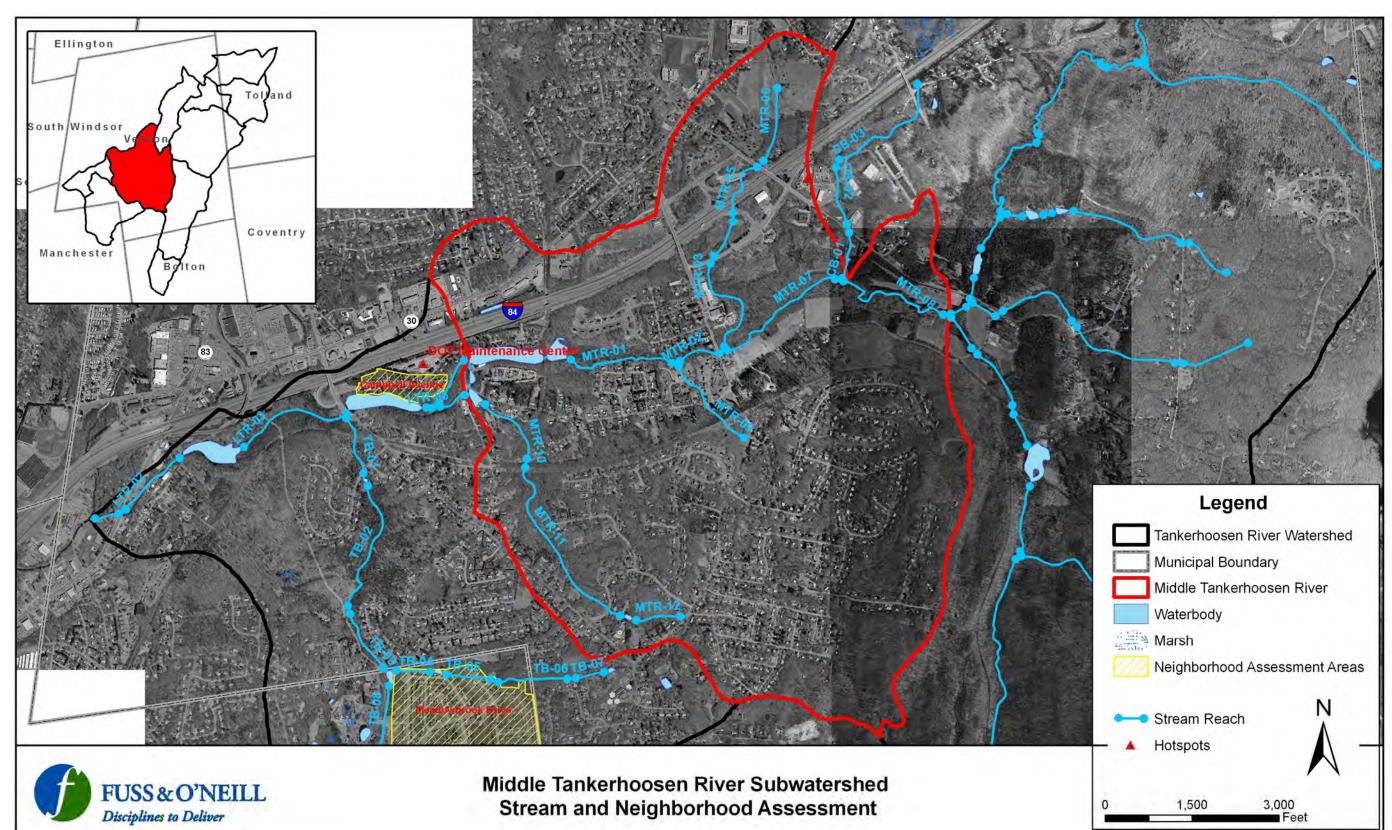
2.2.3 Middle Tankerhoosen River

Reaches in this subwatershed are labeled MTR-01 through MTR-12. Stream assessments were conducted on representative reaches including MTR-01, MTR-02, MTR-07, MTR-08 and MTR-09 (Figure 5). Segments MTR-01, MTR-02 and portions of MTR-09 were inventoried on June 4, 2008, while the remaining segments were assessed on June 5, 2008. Residential use is the dominant land use in the subwatershed, and Interstate 84 traverses the northern portion of the subwatershed. The Upper Tankerhoosen River and Clarks Brook drain to the Middle Tankerhoosen River, which feeds the Lower Tankerhoosen River.

MTR-01

This stream segment begins at the inlet to Tankerhoosen Lake and ends at the confluence of segments MTR-02 and MTR-09. The stream flows parallel to the back yards of a residential neighborhood

• RCH — The reach level assessment indicates suboptimal in-stream habitat, vegetative protection, bank erosion and floodplain connection. The overall buffer and floodplain conditions are generally marginal, with limited vegetative buffer width, floodplain



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Figure 5. Middle Tankerhoosen River Subwatershed Ffield Aassessment Locations



vegetation and habitat and moderate floodplain encroachment. The dominant in-stream substrate is gravel and cobble, and 50 percent of the stream surface is shaded.



Stream segment MRT-01 has areas with little or no vegetative buffer.

- OT —Four outfalls were observed along the left bank of the stream. Three of the
 outfalls are storm drainage pipes that convey stormwater runoff from the adjacent
 residential development. Sediment accumulation was observed at the outlets of several
 of the outfalls. An ABS outfall pipe was observed behind a residence. The pipe was
 submerged below the stream water surface at the time of the inspection. The source of
 this pipe and the nature of the potential discharge from the pipe should be
 investigated further.
- TR Three instances of trash and/or debris were observed along this segment. TR-01 is a commercial-grade 55-gallon plastic drum located within the stream. The contents of the drum could not be determined. TR-02 consists of brush and debris stockpiled along the bank of the stream. The material was placed by the Town of Vernon following removal of a beaver dam, but never removed. TR-03 consists of approximately 16 plastic buckets that are submerged or partially submerged below the water surface of the stream. The contents of the buckets are unknown. Both areas should be the focus of stream cleanup efforts.
- IB The left bank along much of the stream segment consists of residential lawns immediately adjacent to the stream, with little or no stream buffer. Stream bank erosion was observed in some areas along the left bank, including evidence of animal burrows in the stream bank below the exposed roots of the lawn.

MTR-02

Reach MTR-02 begins at the confluence with MTR-09 and ends at Tunnel Road. This braided stream segment also flows adjacent to residential properties.

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- RCH The right bank consists primarily of residential lawns with little or no buffer, while the left bank has a modest vegetated buffer consisting of shrubs and mature forest. The in-stream flow fills the channel, and the substrate is dominated by gravel. There are no aquatic plants in the stream, and the water surface is approximately 50 percent shaded. Sediment deposits were observed in areas of the stream channel. Generally, the stream ranges from suboptimal to marginal for overall stream conditions and buffer and floodplain conditions. The left bank is characterized as optimal for bank erosion and vegetated buffer width. The right bank has poor vegetative protection.
- OT A 14-inch diameter concrete pipe conveys stormwater runoff from Tunnel Road. No dry-weather flow or other visible evidence of pollution was observed.
- SC Twin box culverts carry flow below Tunnel Road. The culverts are concrete, approximately 4 feet in diameter and 13 feet in length.

MTR-07

This segment begins at Tunnel Road and ends at the confluence of the Tankerhoosen River and Clarks Brook. The primary land use along stream segment MTR-07 is forested and agricultural land, with a small area of adjoining residential land near Tunnel Road.

• RCH — The reach level assessment identifies this segment as generally optimal, with high ratings for overall stream conditions and buffer and floodplain conditions. The reach is dominated by gravel and cobble substrate, clear water, no in-stream vegetation, observed fish and terrestrial wildlife, and a mostly shaded stream.

MTR-08

Segment MTR-08 begins at the confluence of Clarks Brook and the Tankerhoosen River and ends at the confluence of Railroad Brook and the Tankerhoosen River. The surrounding land use is forest or cleared fields.

• RCH — This segment is characterized by gravel and cobble substrate, no attached or floating aquatic plants, wildlife including fish, deer, raccoon, and songbirds, and the stream is mostly shaded. Some evidence of channel widening was observed. The overall stream, buffer and floodplain conditions are rated as optimal.

MTR-09

Stream segment MTR-09 is a tributary of the Tankerhoosen River that begins at the main stem of the Tankerhoosen River and extends upstream, crossing Warren Avenue and ultimately ending at Tunnel Road. The surrounding land uses are residential, forested, and wetlands, including a section of the Rails to Trails.

 RCH — The reach level assessment rates this segment as suboptimal to marginal. Bank erosion and floodplain connection for the reach is rated as marginal. The floodplain habitat and encroachment are also at a marginal level. The dominant substrates are sand, gravel and cobble. There are no aquatic plants in the stream, and the water surface is mostly shaded. There is evidence of bank scour along the reach. Issues identified along this reach include stormwater outfalls, severe bank erosion, stream crossings, and trash and debris.



- OT A total of 10 stormwater outfalls were identified along this reach. A majority of the outfall pipes are smaller than 8 inches in diameter, appear to be residential foundation drains, and do not warrant further investigation. Several of the outfall pipes are associated with the roadway drainage system. There are two 2-foot diameter pipes along the left bank which do not have dry-weather discharge and are clean and not submerged. A black ABS pipe observed in the stream appeared to originate from a residence along Warren Avenue. A trickle of flow was observed from the pipe, and brown sediment accumulation was observed in the stream near the outfall. The source of this pipe and the nature of the potential discharge from the pipe should be investigated further.
- ER An area of bank erosion was observed along the left bank, measuring approximately 20 feet in length and 6 feet high. The erosion severity is moderate and there is good access to the bank from the residential areas north of Warren Avenue. This area is a potential candidate for bank stabilization.
- SC There are two road crossings and a rail crossing along this reach. The stone blocks on the outside of the Rails to Trails culvert crossing are partially dislodged and in need of repair. The Tunnel Road stream crossing has debris partially blocking the outlet of the culvert. The outlet of a concrete box culvert located north of Warren Avenue is perched approximately 14 inches above the elevation of the stream bed and is a potential barrier to fish passage. This culvert is a potential candidate for fish barrier removal to address the perched outlet.

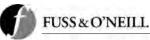


The Tunnel Road stream crossing (A) and the Rails to Trails crossing (B).

TR — Four instances of trash and debris were noted along this stream segment. Three consist of minor quantities of yard waste, while the fourth consists of approximately 2 to 3 pickup truckloads of leaves, logs, tree stumps and tires. This stream segment is a potential candidate for a stream cleanup.

2.2.4 Walker Reservoir

Reaches assessed in this watershed include WR-01 through WR-05 (Figure 6). Land use in this watershed includes a former outdoor sports complex, a Connecticut Department of



Transportation (ConnDOT) commuter parking lot, the Interstate 84 and Route 31 interchange, and several residential areas. The water bodies along the stream reaches in this subwatershed, including Walker Reservoir East and West, receive upstream flow Gages Brook and the Gages Brook South Tributary, as well as runoff from Interstate 84, Route 31, and residential developments. Segments WR-03 and WR-05 were assessed on June 3, 2008, while the remaining segments were inventoried on June 4, 2008.

WR-01

This reach is located between Walker Reservoir West and Interstate 84, and receives flow from an upstream pond and the highway. The stream is braided and is surrounded primarily by forested land.

- RCH The reach is generally braided with a sandy bottom and a mostly-shaded stream surface. Channel widths were variable due to the braided nature of the stream, with the flow containing less than 25 percent of the channel width. Stream condition metrics in this reach are extremely poor with little habitat potential. Buffer metrics were somewhat better, with suboptimal (25-50 feet) width and mature forest vegetation. No notable floodplain was present.
- OT A drainage ditch outfall originating from Interstate 84 is present near the upstream end of the reach. The channel contained excessive debris that should be removed. There was no flow when it was observed.
- SC A stream crossing is present below Route 84. The 24-inch, steeply-sloped, corrugated metal pipe conveys flow from an upstream pond and reach WR-02 located north of the highway. The culvert is acting as grade control and has significant accumulated debris near its outlet. This reach also includes a chain link fence associated with the highway that has significant accumulated debris on the upstream side of the stream. The debris should be removed.

WR-02

This reach is located immediately upstream of the Interstate 84 culvert crossing and downstream of a pond, and situated at the southern end of the Mount Vernon Apartments.

- RCH This reach is mostly shaded with a variable bottom of gravel, sand, and cobble. In stream habitat and vegetative protection was generally marginal, with suboptimal bank stability and floodplain connection. Buffer and floodplain condition was generally suboptimal to marginal, with significant impacts from human activities and little habitat diversity.
- SC The Interstate 84 stream crossing described above is located at the downstream end of this reach. Generally, stream crossings separating reaches were considered to be associated with the downstream reach. However, the characteristics of the culvert inlet differ from the outlet; the upstream inlet is a 4-foot diameter pipe while the outlet is a 2-foot diameter pipe. A transition is suspected to occur at some point within the crossing.

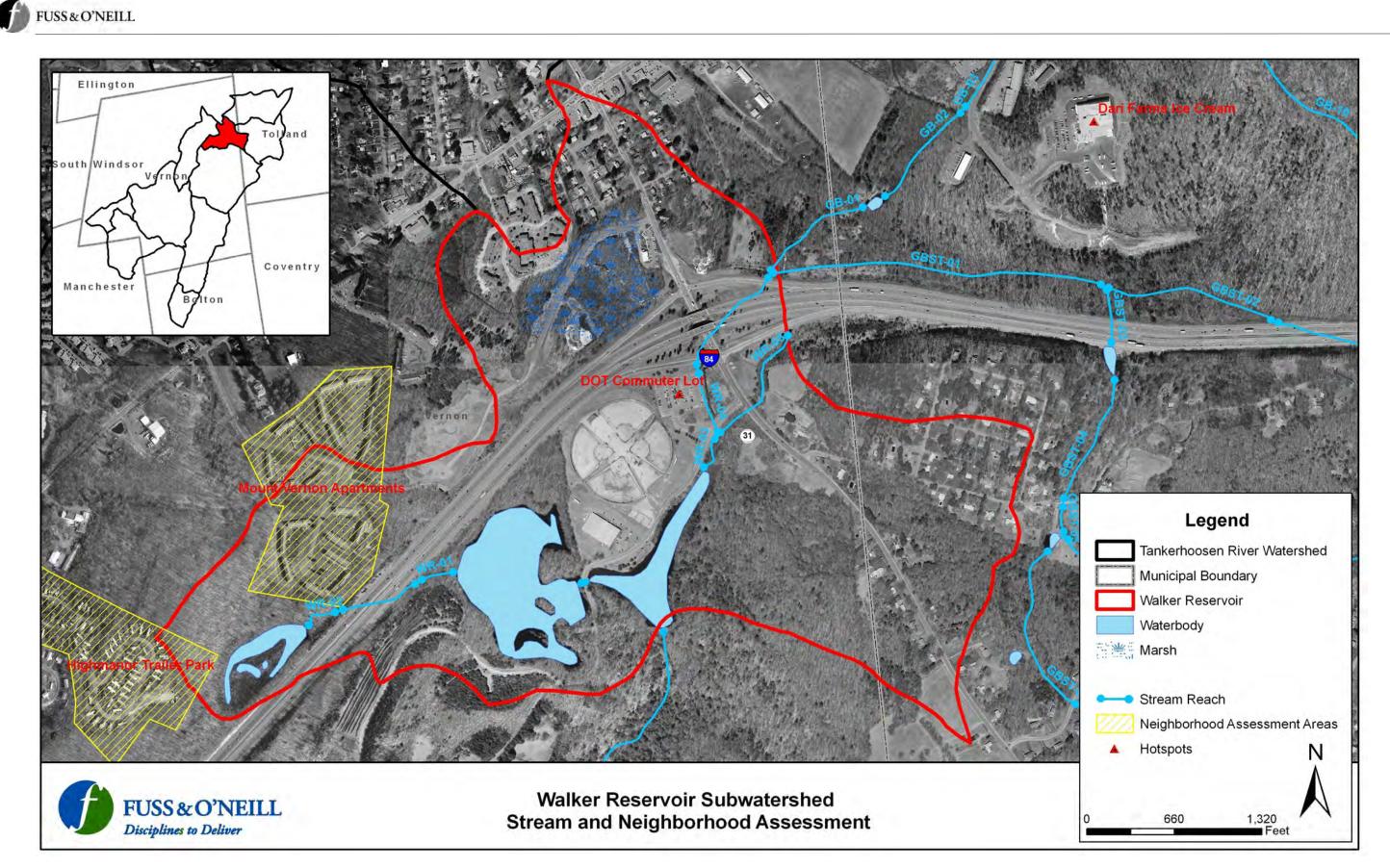


Figure 6. Walker Reservoir Subwatershed Field Aassessment Locations



WR-03

This stream reach connects Walker Reservoir East with reaches WR-04 and WR-05 and runs parallel to the east side of Reservoir Road, opposite the former outdoor sports complex.

- RCH This reach is mostly shaded and includes a bottom of fine material including silts, clays, and sand. The reach is variable in width and depth, but is generally well shaded. A variety of wildlife was observed, including fish, beaver, deer, snails, and birds. Evidence of channel widening and sediment deposition was observed. The overall stream condition is generally suboptimal, with the in-stream habitat, vegetated buffer width on the right bank and floodplain encroachment rated as marginal.
- SC A 4.5-foot diameter circular metal pipe is located on the right bank near the upstream end of the reach. The culvert appears to originate from stream reach WR-04 and crosses under Reservoir Road.

WR-04

The stream reach WR-04 begins on the south side of Reservoir Road at the confluence of segments WR-03 and WR-05. WR-04 is a drainage ditch that flows parallel to the commuter parking lot between the Interstate 84 off-ramp at Exit 67 and Reservoir Road.

- RCH —Stormwater runoff from the commuter parking lot discharges directly into the stream through an outfall. The channel near the commuter lot contains significant invasive wetland vegetation (cattails and reed canary grass). The stream assessment rated this segment as generally suboptimal to marginal. The channel substrate is fine material including silt/clay and sands (sediment deposition). The water is observed to be turbid and there are some aquatic plants in the stream, which is partially shaded. The stream segment is readily accessible from the adjacent commuter parking lot.
- OT The outfall that drains the commuter parking lot discharges to the stream through a 3-foot diameter concrete pipe. This outfall is a potential stormwater retrofit candidate to treat runoff from the parking lot.
- SC —Stream crossing SC-01 conveys flow below Reservoir Road and consists of a circular 4.5-foot diameter circular metal pipe. The pipe inlet is partially clogged with autumn olive and maintenance should be performed to remove the blockage. The second stream crossing in this segment, SC-02, is at the upstream end of the segment and crossed underneath the off-ramp for Exit 67 on Interstate 84. The culvert is circular with a diameter of 4 feet. There is evidence of sediment deposition, but otherwise the culvert is in good condition.

WR-05

Segment WR-05 is located between the confluence of WR-04 and WR-03 on the south side of Reservoir Road and the on-ramp for Exit 67 on Interstate 84. The stream flows in a southwesterly direction along this reach, crossing under Route 31 (Mile Hill Road).

• RCH – This segment is rated as suboptimal in the categories of in-stream habitat, vegetative protection and bank erosion, and rated as poor floodplain connection. The buffer conditions are generally marginal and there is extensive floodplain

encroachment. The surrounding land use includes public roads (Interstate 84 and Route 31) and a portion of the commuter parking lot. There is a small vegetated buffer along the stream corridor on the upstream portion of the stream segment, although beyond the buffer are cleared fields. The dominant substrates are sand and gravel, with limited cobble. There is evidence of fish, raccoon, great blue heron and Canada geese in the stream corridor. The stream has evidence of sediment deposition and portions have been channelized.

• OT – Stormwater outfall OT-01 is an earthen channel located on the left bank upstream of the Route 31 crossing. The channel originates from an adjacent residential property and was observed to have significant (3 to 4 feet deep) headcutting (erosion of the channel progressing upstream). A moderate flow of clear water was discharging from the channel at the time of the inspection. The property owner indicated that the source of the flow is groundwater seepage and surface runoff from upgradient areas. A discharge investigation is recommended, and this channel is a potential candidate for stream bank stabilization. The second outfall, OT-02, is a paved asphalt channel on the right bank, 8-inches deep and approximately 3 feet wide. The channel conveys road runoff.



Eroded channel and discharge from a residential property.

SC — Two stream crossings were identified along this reach. SC-01 is the stream crossing underneath Route 31 (Mile Hill Road), and SC-02 is the culvert underneath the on-ramp for I-84. Both crossings consist of twin concrete box culverts approximately 6 feet wide and 9 feet in height. Both have embedded bottoms. Sediment deposition was observed in the stream channel at both locations, which is believed to originate from Interstate 84 and channel erosion described above.



Twin box culvert along reach WR-05 underneath the onramp for I-84.

2.2.5 Gages Brook

A total of 2.2 stream miles were assessed in Gages Brook (Figure 7), including segments GB-01 through GB-10, during June 3 through 5, 2008. The primary land uses in this subwatershed include commercial development along Route 30, industrial uses associated with the Tolland Industrial Park, and residential and forested areas in the eastern portions of the watershed. The Gages Brook stream assessments performed for this study augment previous stream surveys performed by the North Central Conservation District in October 2007 between the Tolland Agricultural Center footbridge and Industrial Park Road West.

GB-01

This primarily forested reach of approximately 0.18 miles is the downstream-most reach of Gages Brook and extends from the Interstate 84 culvert crossing to the footbridge behind the Tolland Agricultural Center (TAC).

- RCH The reach was mostly shaded, with optimal habitat, and vegetation and floodplain characteristics ranging between suboptimal and marginal.
- OT Two outfalls were identified, both of which are believed to be drainage ditches associated with Interstate 84 located just upstream of the highway. Little discharge was present despite intermittent rain over the previous 1 to 2 days. The drainage ditches are potential candidates for stormwater quality retrofits.
- ER Two areas of severe bank erosion were identified. ER-01 included a 300-ft length of severe bank scour downstream of one of the outfalls described above. In a small section (30-40 feet), the stream was flowing mostly within an undercut section of the back, such that the channel bottom was mostly dry. ER-01 appeared to be located on private property and would be difficult to access. ER-02 included a 150-ft section of

undercut bank at a 90-degree bend where the stream enters CM-01. ER-01 may be located on State property but may also be difficult to access. While both areas of erosion are in need of restoration, limited site access may make bank stabilization impractical.

- CM An approximately 200-foot long section of stream immediately upstream of the Interstate 84 crossing appeared to be straightened, disconnected from the floodplain, and modified to create a riprap-lined channel with trapezoidal cross section.
- TR A deposit of brush, logs, and disassembled fencing was observed immediately adjacent to the stream less than 100 feet downstream of the footbridge at the TAC grounds. The material should be removed during a stream cleanup.

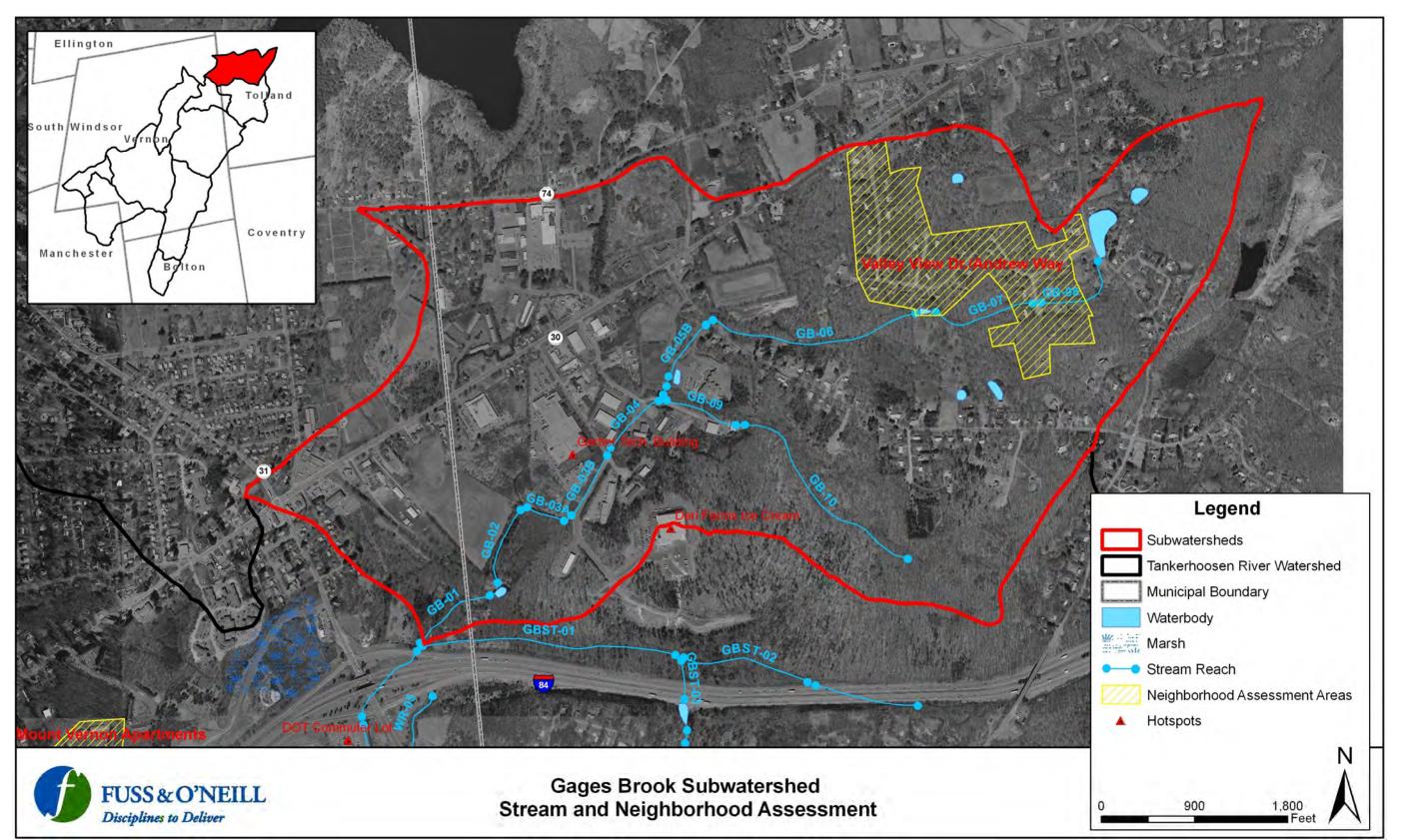
GB-02

This reach of approximately 0.17 miles continues upstream from the TAC footbridge northeast to a transition from forest to old field. The reach is generally wooded with significant wetlands located in the floodplain.

- RCH The stream is mostly shaded with some evidence of sediment deposition. Instream habitat was marginal, with other in-stream metrics ranging from suboptimal to optimal. The reach includes a high-quality buffer and good floodplain connection, with associated metrics ranging from suboptimal to optimal.
- TR A small quantity of automotive debris was observed and should be removed. Access is difficult, although cleanup would be straightforward.

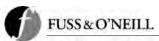


Trash and debris in stream segment GB-02



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Figure 7. Gages Brook Ssubwatershed Field Assessment Locations



GB-03A

This reach begins where GB-02 emerges from the forest and extends east, with the forest to the south and the old field to the north, ending at Gerber Drive in the Tolland Industrial Park.

- RCH The reach is mostly shaded with old field to the right and forest to the left. Bed scour and bank scour were observed in some areas. Most stream, buffer, and watershed condition metrics were in the marginal to suboptimal range, with low-end marginal habitat and marginal floodplain connection. However, there was little floodplain encroachment, and the vegetated buffer was high-end suboptimal to optimal in condition.
- OT A wet stormwater basin associated with the industrial park discharges to the stream at the upstream end of the reach. Dense vegetation was growing in the riprap and erosion was present on the adjacent downstream bank in GB-03A
- ER An approximately 100-foot long area of bank scour was observed in a straight section of the right bank. The severity of the erosion was relatively minor and appeared to originate downstream of OT-01. Access to this area is fair, although it is likely in private ownership.
- SC A stream crossing is present below Gerber Drive and consists of two elliptical corrugated metal culverts. Fish passage may be difficult through these culverts due to shallow depth of flow during low-flow conditions.

GB-03B

This reach of approximately 0.14 miles runs parallel and adjacent to Gerber Drive between the crossings at Gerber Drive and Industrial Park Road West. The reach is located in a narrow, modified channel between the road/retaining wall and the parking lot of an adjacent industrial facility.

- RCH Stream condition metrics in this reach were generally suboptimal. Buffer and floodplain metrics were marginal to poor since significant encroachment is present on both sides of the stream. Artificial fish habitats (lunkers) were found along the stream banks, and fish were observed in the stream as well as evidence of raccoons and songbirds in the stream corridor.
- OT Four outfalls were present in this reach, including two paved asphalt swales ("leakoffs") directing surface runoff to the stream from adjacent parking lots, a 12-inch concrete pipe originating from the parking lot of an adjacent industrial facility, and a 24-inch concrete pipe suspected to be associated with the roadway drainage system. Significant trash was present at the outlet of one of the leakoffs.
- IB The majority of the stream reach has limited and highly impacted stream buffers. At the downstream end of the reach, a retaining wall is located along the top of the right bank, and industrial parking lots are located close to the left bank. Due to the limited area on both sides of the stream, there is low potential for stream restoration along this reach.



Concrete retaining wall adjacent to Gerber Drive along segment GB-03B

• SC - The reach terminates at the Industrial Park Road West stream crossing, which consists of three 72-inch corrugated metal pipe culverts. The left barrel was slightly out of round. The majority of flow was through the left barrel; the bottom of the center barrel was dry, and the right barrel appeared to have some backflow. The flow depth in these culverts may be insufficient for effective fish passage during low-flow conditions. This crossing is a potential candidate for fish barrier removal. The inlet of the culverts was partially obstructed by brush and debris, which should be removed.

GB-04

Reach GB-04 is located between Industrial Park Road West and Industrial Park Road East. The reach includes numerous outfalls and significant sedimentation.

- RCH The reach is mostly shaded, although the buffer is significantly impacted on both sides. Stream condition metrics were generally within the suboptimal range, although poor floodplain connection was observed. The vegetated buffer width is suboptimal on the left and marginal on the right, and the vegetation quality is at the lower limit of the suboptimal range. Both the floodplain habitat and floodplain encroachment metrics were poor.
- OT Six outfalls were observed in this reach, originating from the industrial areas or associated roadways. These included an 8-inch corrugated metal pipe, a 6-inch plastic pipe, a 7-inch plastic pipe (OT-03) with some sediment deposition immediately downstream, a 12-inch concrete pipe draining a parking lot, a double 42-inch culvert that conveys roadway storm drainage, and a 24-inch concrete pipe conveying roadway drainage to the stream. The source of the sedimentation at OT-03 should be investigated.



• SC - This crossing includes triple 72-inch culverts below Industrial Park Road East. The depth in one pipe was approximately 6-12 inches, while the other two barrels were blocked with leaves, branches and sediment. The blockage should be cleared by removing the material.

GB-05A

This reach continues upstream from GB-04 to GB-05B. The reach GB-05 was subdivided into two separate reaches because the confluence of GB-09 and GB-04 occurred a few hundred feet upstream of the location shown in the original mapping (the figure shows the updated reach segments).

- RCH This reach is mostly shaded with a gravel and cobble bottom, with some sedimentation and bank scour observed. In-stream habitat was optimal, with a mix of stable and naturally occurring substrate and habitat conditions. The majority of the remaining stream, floodplain, and buffer condition metrics were in the suboptimal range, although with marginal floodplain connection and encroachment.
- OT One outfall pipe was observed on the left bank just upstream of Industrial Park Road East and appeared to originate from an adjacent industrial area.

GB-05B

This reach extends from the confluence of GB-05A and GB-09 upstream to Old Post Road. The stream passes through the landscaped grounds of a technology company and much of the reach is unshaded. This reach may provide an opportunity for bank stabilization and stream buffer restoration, since it appears to be located on land owned by a single (although private) owner. Community garden plots were observed adjacent to the stream, and solar panels were being constructed on-site, indicating that the owner may be environmentally-motivated. A wet stormwater basin is located on the property between an on-site parking lot and the stream.

- RCH Stream condition metrics in this reach are generally suboptimal to poor, with little or no vegetative buffers, significant erosion problems, and little floodplain or floodplain connection. Water from the stream appears to be diverted through the onsite stormwater basin via a catch basin diversion structure. Buffer and floodplain condition metrics were marginal to poor, with narrow vegetated buffer width (10-25 feet) floodplain vegetation consisting of turf, little or no wetland habitat, and significant floodplain encroachment.
- OT An 8-inch PVC outfall was observed originating from the on-site stormwater basin. Bank erosion and riprap was observed at the outfall. Some debris was present at the outfall, including pieces of plastic pipe.
- ER A significant area of bank erosion was observed in a bend in the stream. The erosive cut was approximately 5.5 feet in height and greater than 100 feet in length. This area is a potential candidate for stream bank stabilization.





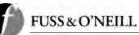
Stream segment GB-05B showing limited vegetative buffer and a small footbridge crossing the stream.

• IB – Little or no vegetative buffer exists along the stream through the commercial/office building site. Mowed lawn borders much of the stream on both sides, and several footbridges have been constructed over the stream. This stream segment is a potential candidate for stream buffer restoration.



Stream segment GB-05B showing area of stream bank erosion.

• SC - Two stream crossings were observed, including a 36-inch culvert below the facility access road and a 50-inch culvert below Old Post Road. Both culverts are perched on the downstream side approximately 2 to 4 inches above the bottom of the stream, and both have very shallow flow (less than 1 inch), which presents a barrier to fish passage.



The former appeared to be in good condition and the latter appeared to have been recently slip-lined. These culverts are potential candidates for fish barrier removal.

GB-06

This reach of approximately 0.4 miles in length continues from Old Post Road to a former pond located south of a residential subdivision on Valley View Drive.

- RCH The reach was mostly shaded with a bottom of gravel, cobbles, and boulders. Evidence of downcutting was present along much of the reach since many of the boulders were sharp-edged. In general, stream condition metrics were marginal or poor, with significant erosion, marginal vegetative protection, and marginal floodplain connection due to downcutting. Overall buffer and floodplain characteristics were generally suboptimal, with a relatively wide buffer of young forest and a mix of wetland and upland habitat.
- OT Three outfalls were present at the downstream terminus of the reach. These included 12-inch and 15-inch storm lines and a paved asphalt leakoff conveying stormwater runoff to the stream.
- ER Numerous areas of significant erosion were identified along this stream segment. Three areas of bank scour on the outside banks of bends were observed. One area included a low-head concrete dam where the stream eroded the abutment, creating a bypass channel around the structure. The last area included active downcutting ending at a nick point behind several residences at the terminus of the reach. These areas are potential candidates for stream bank stabilization.



Stream segment GB-06 showing area of stream bank erosion.



- IB An impacted buffer was observed at the terminus of GB-06 near a footbridge on private property. Residential landscape vegetation (pachysandra) was observed growing up to the bank's edge.
- SC Three stream crossings were present in this reach, each of which likely prevents upstream fish passage. The first is located adjacent to Old Post Road at the downstream end of the reach. This crossing consists of an embankment such as a dam or railroad grade that does not include a culvert or opening. The stream appeared to be flowing through interstices in the embankment. The second crossing consisted of a dam with a total hydraulic drop of approximately 9 feet. The third crossing is a former road with a corrugated metal pipe culvert and a drop at the culvert outlet of approximately 5 inches. These crossings are potential candidates for dam removal and/or fish barrier removal.

GB-07

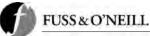
This reach of approximately 0.2 miles in length continues upstream to the east from GB-06 to Andrew Way. The stream corridor is generally forested, surrounded by residential development along Valley View Drive, Andrew Way, and Old Post Road.

- RCH The reach is mostly shaded with a bottom of cobbles and boulders. Typical channel dynamics include downcutting and bed scour. The reach is mostly shaded. Stream conditions were generally within the suboptimal to marginal range, while buffer and floodplain characteristics were generally optimal to the high end of suboptimal.
- IB Similar to the residential encroachment observed in reach GB-06, an isolated area of pachysandra and lawn were present on both sides of the stream where the stream enters SC-01.
- SC This crossing includes an approximately 200-foot long, 24-inch concrete culvert below Andrew Way. A series of small drops (approximately 24 inches) were present downstream of the outlet. These drops were resulting from the boulders lining the channel. These drops and shallow flow in the culvert under low-flow conditions would likely limit upstream fish passage. This culvert is a potential candidate for fish barrier removal.

GB-08

This reach of 0.15 miles is the uppermost stream segment on Gages Brook, which is located between Andrew Way and a privately-owned pond situated north of Mountain Spring Road. The stream segment flows primarily through residential and forested areas.

- RCH This reach is mostly shaded with a sand and gravel bottom and a stable channel with little noticeable erosion. Stream condition metrics are within the suboptimal range in this reach, while buffer and floodplain connection generally are within the optimal and suboptimal ranges.
- OT An outfall was identified adjacent to a residence near the downstream limit of this reach. The outfall consisted of a 2.5-inch diameter PVC pipe with a screen projecting



over the water surface by approximately 6 inches. The pipe may be the outlet of a foundation or yard drain.

- IB Residences and lawn are located adjacent to the stream for approximately 300 feet on both sides of the stream near the downstream end of the reach.
- SC The upstream limit of this reach consists of a low-head dam with an outlet weir discharging directly to an 18-inch concrete culvert below Mountain Spring Road.
- TR An area of trash and debris was observed in the stream and buffer (right side) near the outlet of SC-01. Observed debris consisted of a tire, two 55-gallon drums (partially crushed with holes) and a bathtub. This debris should be removed and disposed of properly.

GB-09

This 0.15 mile reach parallels an access road and industrial facility located at the end of Industrial Park Road East.

- RCH This reach has a gravel and cobble bottom, is mostly shaded, and has evidence of downcutting, bed scour, and bank failure. In-stream habitat is generally optimal to the high end of suboptimal. Buffer and floodplain characteristics are generally suboptimal to marginal due to the reach's incised nature and industrial land use along the left side.
- OT This reach includes two outfalls. The first is a paved asphalt leakoff from a parking lot paired with a 6-inch PVC outfall causing slight bank erosion. The other outfall, OT-02, is an 18-inch plastic pipe discharging from the direction of the industrial facility. There was significant iron staining around this outfall. The source of the discoloration should be investigated.
- SC A small dam is present in this reach, consisting of a weir with a drop of approximately 32 inches. Immediately downstream of the weir an area of soil has been undercut by the stream, forming a natural culvert, although one that is unlikely to significantly alter passage during low flow conditions.

GB-10

This reach of approximately 0.43 miles extends from the upstream limit of GB-09 into an extensive wetland complex where the stream originates in an area of groundwater seeps. This reach passes through a recently-constructed subdivision off of Old Post Road that does not appear on the aerial photos in the project mapping.

• RCH - This reach is mostly shaded with a gravel and cobble bottom and included some evidence of downcutting and sedimentation. The overall stream, buffer, and floodplain conditions were in the optimal range for every metric. The majority of the stream is surrounded by an extensive old-forest/wetland complex that is well connected to the stream channel. There is little evidence of encroachment except at the subdivision crossing.



- OT One stormwater outfall to the stream was identified. The outfall originates from a new subdivision road and discharges to a stormwater basin/constructed wetland. The basin contained a significant quantity of leaves and other sediment. Stormwater discharged to the buffer of the stream via overland flow and continued to the stream. There appeared to be potential for future erosion where overland flow is occurring. Two other stormwater basins associated with this subdivision were observed, but the outfall locations could not be identified.
- SC A new stream crossing was observed under the subdivision road, consisting of a 24-inch concrete pipe. A boulder was present below the flared-end outlet. The culvert outlet is perched several inches above the stream bed, and the depth of flow in the pipe was approximately 1-inch. Due to the headwater location of the culvert, upstream fish passage is unlikely to be an issue in this portion of the watershed.



New stream crossing on segment GB-10.

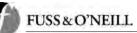
2.2.6 Gages Brook South Tributary

An unnamed tributary to Gages Brook (referred to as the Gages Brook South Tributary in this study) drains an area located south of the Gages Brook subwatershed. Reaches GBST-01 through GBST-04B and GBST-09A and GBST-09B were assessed on June 5, 2008, totaling approximately 1.3 stream miles (Figure 8). The subwatershed is bisected by Interstate 84 and contains forested and residential land uses.

GBST-01

This reach is approximately 0.5 mile in length and extends along Interstate 84 in an area that is otherwise relatively undeveloped.

• RCH - The stream is well-shaded, has a cobble and gravel bottom, and was found to be in optimal condition in terms of both overall stream, buffer, and floodplain characteristics. Evidence of downcutting, sedimentation, and scour were observed in some areas, but in general the reach is well-connected to the floodplain and appeared



to provide optimal wildlife habitat and vegetation conditions. Moss was observed on portions of the stream banks where erosion had occurred, indicating that the banks have since stabilized.

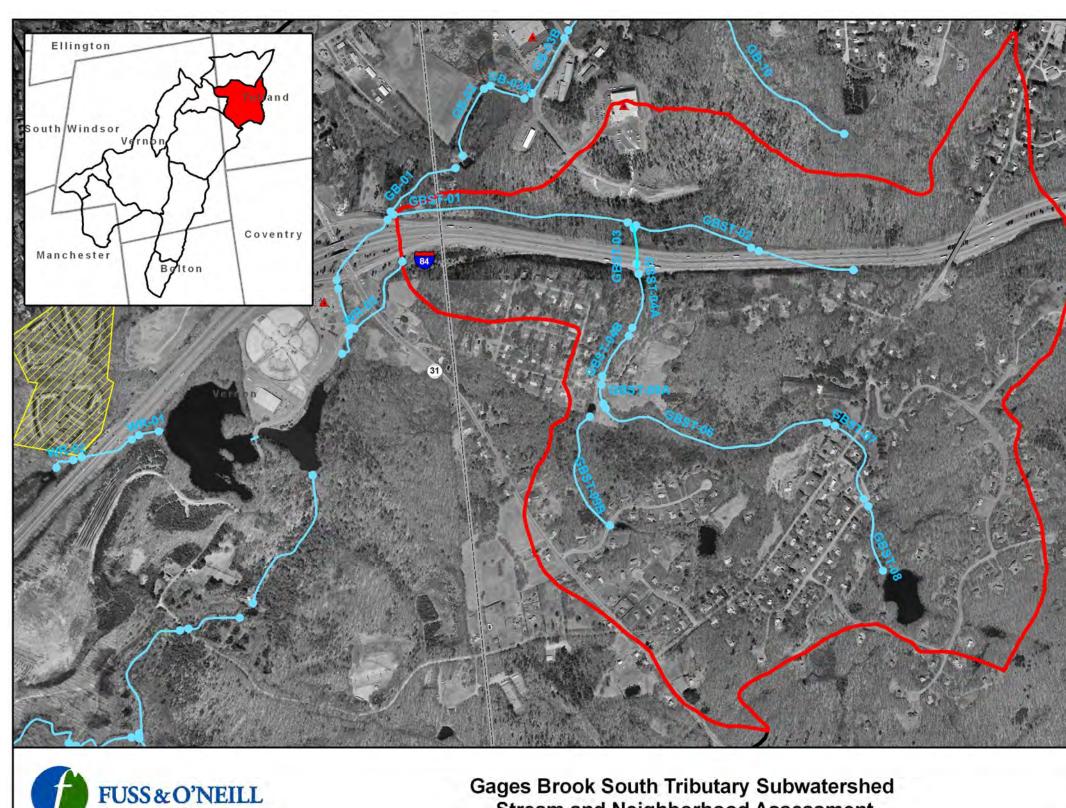
GBST-02

This reach of approximately 0.26 miles begins at its confluence of GBST-03 and continues upstream to the east generally running parallel to Interstate 84. The upstream end is a pair of culverts, one of which conveys the stream below Interstate 84 and the other which parallels the highway.

- RCH This reach includes a bottom of gravel, cobbles, and boulders and has portions that are downcut and channelized. This reach is mostly shaded and was evaluated to be in the suboptimal range for most stream condition metrics. However, vegetative protection of the banks was generally optimal, as was the vegetated buffer width, floodplain vegetation, and floodplain habitat in most areas. Encroachments on the stream's buffer and floodplain were limited to an area where the stream was channelized along Interstate 84.
- OT Several outfalls were identified along this reach. Each appeared to be associated with drainage from Interstate 84. Discharges were observed from both OT-02 and OT-03, and although rain fell the previous day. Significant sediment accumulation was observed at the outlet of OT-03 and SC-01. No discharge was present from OT-01, although significant erosion was present downstream of this outfall, which discharges approximately 300 feet from the wetland surrounding the reach. Minor bank erosion was observed downstream of OT-02.
- SC This stream crossing conveys the tributary below Interstate 84. The crossing is a concrete culvert several hundred feet long. The crossing is partially blocked by accumulated sediment.



Stream crossing (SC-01) below I-84 and outfall (OT-03) along reach GBST-02.



Stream and Neighborhood Assessment

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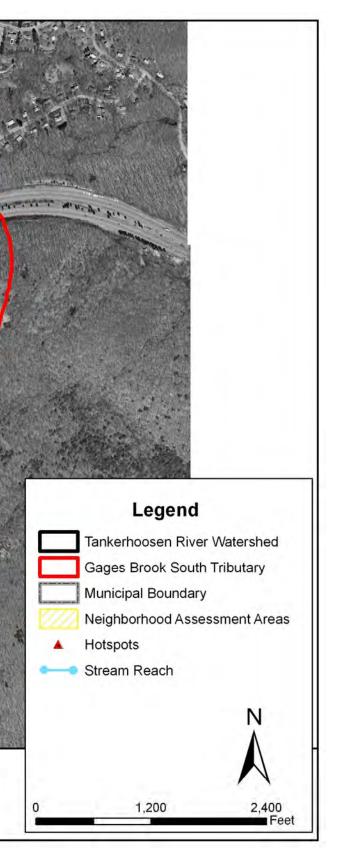


Figure 8. Gages Brook South Tributary Subwatershed Field Assessment Locations



 CM - The channel of GBST-02 has been modified significantly at the upstream end of the reach, which is channelized parallel to Interstate 84 for a length of approximately 700 feet. The channel is a uniform trapezoidal cross-section disconnected from a floodplain and lined with stone riprap.

GBST-03

This is a short reach located between GBST-01 and GBST-04A, which flows below Interstate 84.

- RCH The reach has a relatively steep bottom of boulders, cobble, and sand, and is well-shaded. Stream condition metrics are generally in the suboptimal range since some bank erosion was observed, and the area was generally well vegetated, although modification of the banks was evident. Buffer and floodplain condition metrics were generally suboptimal as well, although the floodplain appeared to be an even mix of wetland and non-wetland habitats with evidence of standing water (optimal) and to have significant encroachment (marginal).
- SC The stream crossing below Route 84 is a significant restriction to the upstream passage of fish. The 48-inch diameter concrete pipe has drop of approximately 4 feet at its outlet, and a series of boulders located downstream yield an additional stepped drop of approximately 10 feet. Additionally, the flow of water in the pipe was shallow. Despite these fish passage restrictions, this crossing is an unlikely restoration candidate since the pipe is below Interstate 84.

GBST-04A

This reach continues upstream from the Interstate 84 crossing to a small dam behind a residence. The field team observed a definitive break in stream and floodplain characteristics at this dam. The reach passes through an area of residential land use. Some evidence of downcutting was observed.

- RCH This reach is generally well-shaded and has a variable bottom with some silt and clay along the downstream portion and with cobbles and boulders upstream. The downstream portion appeared to be a pond that has filled with sediment. Stream condition metrics were all within the optimal range. Overall buffer and floodplain conditions were also optimal, although floodplain was only present in a limited area.
- OT A riprap drainage ditch along Route 84 discharges to the stream near its southern end.
- SC A low-head dam crossing the stream was defined as the upstream limit of this reach. The dam includes a drop of approximately 42 inches.

GBST-04B

This reach continues from GBST-04A to the downstream limit of GBST-06 and GBST-09. The reach passes behind several residences and includes a pond filled with sediment at its lower limit.

 RCH - This reach is mostly shaded with a variable bottom of generally fine material (silt/clay, sand, and gravel). In-stream habitat was marginal, and dense invasive vegetation was present on both banks. Floodplain connection was optimal, however, since the stream was not deeply incised and high flows could easily enter the floodplain.



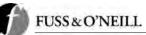
View of reach GBST-04B

- IB Impacted buffer was present near the downstream end of this reach. In this area, the left bank is forested, although the right bank is vegetated with turf, lawn, and shrubs. A single-family home was also located near the stream.
- SC The upstream limit of this reach is located at Loehr Road. The stream flows below the road through a 60-inch corrugated metal pipe. The pipe was deformed at the downstream end, but the invert was inundated by tailwater, indicating that fish passage may be possible.

GBST-09A

The downstream end of this reach is located at its confluence with GBST-06 prior to entering the culvert GBST-04B SC-01. The reach is short in length, receiving the discharge from a small privately-owned pond.

- RCH This reach includes a bottom of cobbles and boulders and appeared to be channelized. The reach is partially-shaded. Stream metrics were generally in the suboptimal to marginal range, although poor floodplain connection was observed. The channel has a buffer consisting of shrubs and brush. Little floodplain is present with poor habitat and connection to the stream.
- SC Two stream crossings are present in this reach. One (SC-01) includes double 16inch HDPE culverts below an unpaved road. The culvert slope is relatively flat but has a shallow water depth that would be unlikely to allow fish passage. SC-02 includes the



dam for a small pond. The discharge of the pond could not be viewed, but is likely to be a significant barrier to fish passage.

GBST-09B

This reach begins from the inlet of the pond at the upstream end of GBST-09A and continues upstream to another pond located at the Tolland Farms Road residential subdivision.

- RCH The reach is mostly shaded with a bottom of gravel, cobbles, and boulders. The stream is downcut and has areas of bank failure and bank scour. As a result, stream condition metrics were generally within the suboptimal range, although floodplain connection was poor. The majority of the buffer and floodplain metrics were found in the optimal range, with ideal vegetated buffer of mature forest and very little floodplain encroachment, although floodplain habitat consisted of a mix of wetland and upland without ponded water (suboptimal).
- OT No outfalls were observed along this reach. However, stormwater runoff from the residential subdivisions on Tolland Farms Road, Deer Meadow and Reed Road is believed to ultimately drain to this reach of the Gages Brook South Tributary. The pond located upstream of Tolland Farms Road may provide some attenuation of peak flows and stormwater quality renovation for this upstream drainage area.
- ER Significant bank erosion was observed on the outside bank of two adjacent bends, each section of erosion being approximately 80 feet in length and 6 to 7 feet in height. This area is a potential candidate for bank stabilization, although site access is difficult in this area.
- SC Two stream crossings were observed along this reach. SC-01 included three 15inch concrete pipes below an unpaved, likely privately-owned, road. The slope of the pipes is moderate, and a drop of approximately 5 inches is present on the downstream end, which is a barrier to fish passage. Limited access, private property ownership, and headwater location make this culvert a poor candidate for fish barrier removal. SC-02 is a 24-inch culvert below Tolland Farms Road. This culvert receives discharge from the control structure of the upstream pond.

2.2.7 Tucker Brook

Tucker Brook is a tributary of the lower Tankerhoosen River. The Tucker Brook subwatershed includes portions of Vernon and Manchester. The predominant land uses in the Tucker Brook subwatershed are residential and forested land. Reaches assessed in this subwatershed include TB-01, TB-02, TB-03, and TB-04 (Figure 9).

TB-01

This lower reach extends from the confluence with the Tankerhoosen River upstream to Brookview Drive. Partially demolished cement building foundations and stream crossings from demolished industrial-era infrastructure remain along the downstream portion of the stream. The upper portion of the reach has significant stream buffers, native vegetation, stream shading and flood plains.



Examples of impacted buffers along reach TB-01. A cement retaining wall (A) for the street and bridge on the right bank near the confluence with the Tankerhoosen River and partially demolished cement infrastructure along the banks (B).

- RCH The reach is mostly shaded with native vegetation, has no attached or floating plants in the stream, and has a sand and cobble substrate bed. There is evidence of bed scour, bank failure and sedimentation along the reach. The overall stream, buffer and floodplain conditions are rated in the suboptimal range.
- OT A 12-inch circular outfall pipe was observed on the right bank, although was not submerged and did not have flow. A possible earthen-type stormwater outfall was identified on the left bank which could collect storm drainage from the highway, but was not flowing during the assessment.
- ER Bank failure and scour is present on the right bank along an approximately 50foot meandering portion of the stream. The bank is currently stabilized by tree roots and other hanging woody debris. The bank appears to be stable.
- IB There is a bridge abutment on the right bank of Tucker Brook at the confluence with the lower Tankhoosen River. The Dobson Road overpass abutment extends approximately 40 feet upstream and is approximately 10 feet from the stream bank. The stream banks and riparian area along the downstream end of the reach at the confluence with the Tankerhoosen River lack a tree canopy; the stream is unshaded in this area. This area is a potential candidate for reforestation.

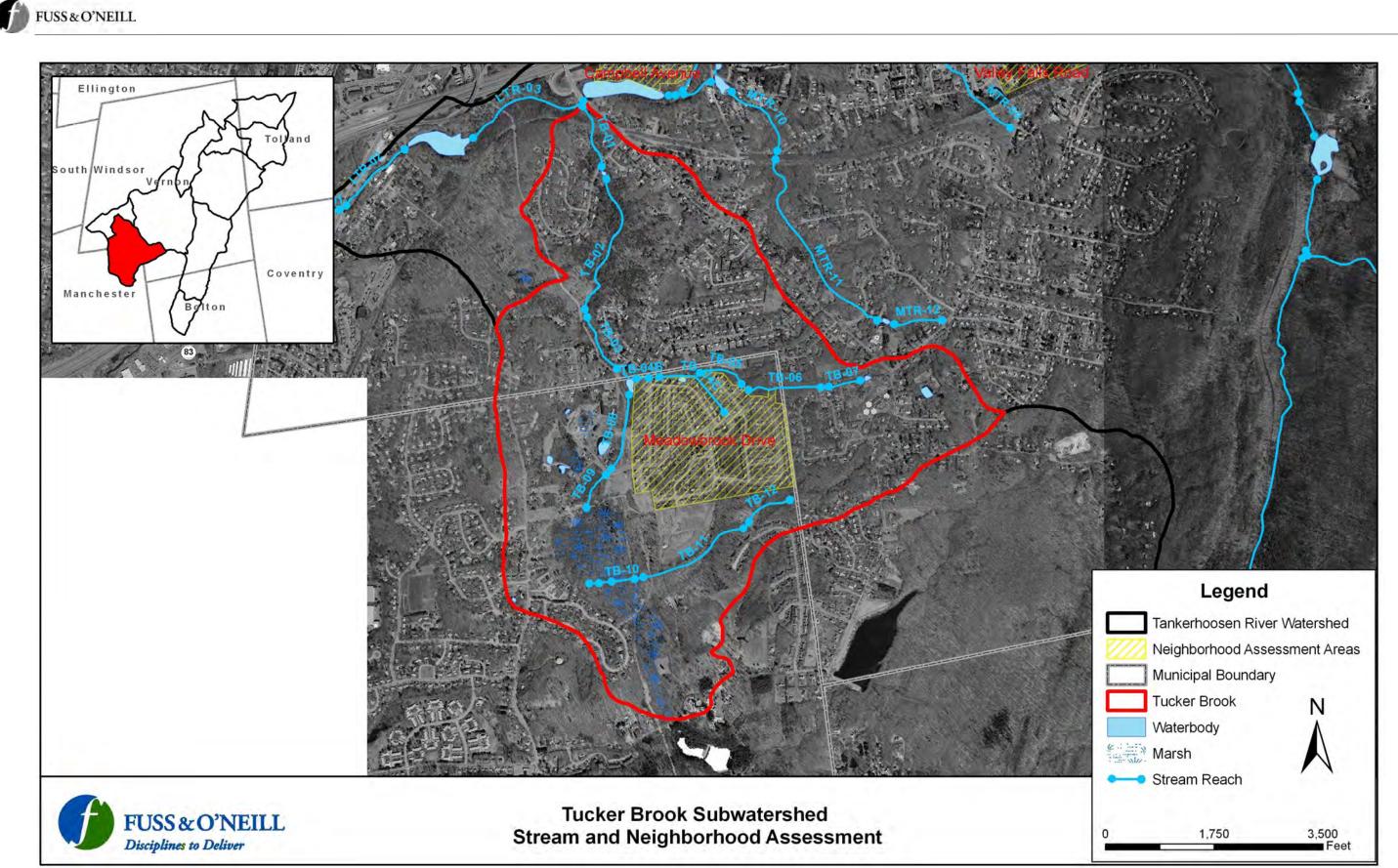


Figure 9. Tucker Brook Subwatershed Field Assessment Locations



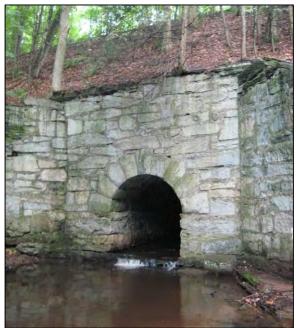
The left and right streambanks along the lower portion of Tucker Brook (foreground) at the confluence with the Tankerhoosen River (background) are potential candidates for reforestation.

 SC — Four stream crossings exist along this reach. SC-01 is an abandoned concrete abutment which was formally a road crossing. The stream crossing has a natural bed so is not an impediment to fish passage, although is a floodplain encroachment concern. SC-02 is a large arch-shaped railroad crossing constructed of stone which is approximately 125 feet long. The archway is in good condition but creates a barrier to fish passage and is suffering from downstream scour. SC-03 is an open-bottom box culvert with some evidence of downstream scour. The final stream crossing, SC-04, is at the upstream end of the reach and consists of a double barrel 6-foot concrete culvert below Brookview Drive. The circular culverts are in good condition although there is downstream pooling and scouring. The boulders placed in the stream for energy dissipation may serve as a barrier to fish passage. Crossings SC-03 and SC-04 are potential candidates for fish barrier removal.

TB-02

A reach level assessment was conducted for this section by examining characteristics of the downstream end, and not traversing the entire reach. The land use around this reach is forested, the stream is mostly shaded, the dominant bed substrate is sand and cobble, and the base flow is less than 25% of the channel width. The overall stream conditions are optimal for bank erosion and floodplain and suboptimal for instream habitat and vegetative protection. There is optimal buffer width along the stream and suboptimal floodplain characteristics.





Arch-type railroad crossing (SC-02) constructed of stone and extending approximately 125 feet. The crossing may prevent fish passage and is suffering from downstream scour evidenced by the large pool shown in the photograph.

TB-03

This stream segment is adjacent to a residential neighborhood (on Ironwood Drive) along the right bank and a gas pipeline corridor along the left bank.

- RCH Overall stream conditions in this section are rated marginal to suboptimal. The vegetative buffer limited due to the close proximity of private residential properties. The stream is flowing at almost 100% of the channel width, is mostly shaded, and has a variable bed substrate consisting of silt, sand, gravel and cobble. There is evidence of downcutting, aggrading, bank failure and scour.
- OT A drainage outfall conveying roadway runoff is located at the upstream end of the reach near Phoenix Street. No dry weather flow was observed.
- ER Bank failure and scour were observed in several meanders along the right stream bank, totaling approximately 125 feet in length. A privately owned shed is located approximately 3 feet from the edge of the bank and is in danger of being damaged by further erosion. This site is a potential candidate for bank stabilization.
- IB Three areas of buffer impacts were noted along this reach. IB-01 is on the right bank and approximately 50 feet long. Dense non-native vegetation associated with a residential backyard is growing on the stream bank. IB-02 and IB-03 are areas along the left stream bank with a reduced buffer resulting from vegetation clearing in the gas pipeline right-of-way.



This section of river is abutted by residential properties along the right bank and has an impacted buffer on this side of the stream from lawn vegetation and items such as this shed.

• SC — The first stream crossing, SC-01, consists of a small manmade dam constructed of boulders and cinder blocks. The dam is approximately 1 foot high and spans the width of the stream. SC-02 is a 48-inch concrete culvert below Phoenix Street. The crossing is in good condition and not a barrier to fish passage.

TB-04A

Stream segment TB-04 was further subdivided into three smaller segments based on field conditions at the time of the surveys. Segment TB-04A begins at the Phoenix Street crossing and ends approximately 500 feet upstream at a beaver dam.

 RCH — The reach level assessment revealed invasive species along the stream, a silt and sand-dominated bed substrate, and mostly shaded stream. There is marginal in-stream habitat, vegetative protection and floodplain characteristics. The bank erosion and floodplain characteristics are optimal due to low banks and wide floodplain. The buffer width is suboptimal because a pumping station and Phoenix Street are in close proximity to the stream.

TB-04B

Stream segment TB-04B is a short segment which begins at the boundary of the Meadowbrook Drive neighborhood and flows to the inlet of the pond created by the beaver dam. This stream segment is characterized by significant growth of invasive species. A stormwater basin associated with the adjacent residential subdivision discharges to this section of the stream.

 RCH — The reach level assessment characterized the stream conditions in this section as suboptimal to marginal due to a lack of vegetative protection along the banks, little in-stream habitat and some bank erosion. The overall buffer and floodplain condition ranges from poor floodplain habitat to suboptimal floodplain vegetation. There is some floodplain encroachment along the reach. The dominant substrate is silt/clay and gravel, and the water is naturally stained. The largest issue observed in the stream segment is the presence of invasive species which are growing over the stream.

- OT —Stormwater outfall OT-01 flows from the stormwater basin that serves the upland residential neighborhood. The outfall is a circular concrete pipe, 18 inches in diameter. Dry weather flow was observed, although the pipe is partially submerged in the stream. There is evidence of bank erosion at the outlet of the pipe and the basin appears to be in need of regular maintenance, including detailed inspection to further assess the condition of the basin.
- TR A small amount of yard waste (TR-01) was observed along the right bank. The debris consists of grass and brush clippings.

TB-04C

Stream segment TB-04C continues through the Meadowbrook Drive subdivision, ending at a system of 6 culverts which cross under Meadowbrook Drive.

- RCH The stream segment flows behind houses, often adjacent to the property line. The close proximity of the stream to these residences has resulted in numerous stormwater outfalls, impacted buffers, stream crossings, and occurrences of trash and debris in the stream.
- OT There are five stormwater outfalls along this reach, ranging in size from 4 to 8inch diameter pipes. The outfalls appear to be associated with residential yard drains, foundation drains, or roof downspouts. All but one outfall pipe had dry weather flow at the time of inspection. The flowing outfall, OT-04, had a trickle of orange discharge, which may be naturally-occurring iron precipitate associated with groundwater discharge. A discharge investigation is recommended nevertheless to confirm the source of the discharge.



Outfall pipe originating from a residential property on the left bank of segment TB-04C.

• IB — There are two areas of stream buffer impacts along this stream segment. Both consist of residential lawn or scrub/shrub vegetation adjacent to the stream. Stream buffer restoration potential is limited due to private land ownership.

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- SC There are two manmade dams and one road crossing along this segment. The
 road crossing forms the upstream end of this segment, and consists of 6 metal arch
 culverts approximately 13 feet in diameter and 5 feet in height. The culverts extend
 approximately 70 feet in length under Meadowbrook Drive. The other two stream
 crossings are manmade dams; one is a stone dam that creates a pool and cascade
 downstream. The second dam creates a waterfall and redirects the stream sharply. Both
 dams are physical barriers to upstream fish passage and should be considered
 potential candidates for removal, although private land ownership may limit this
 potential.
- TR There are two instances of trash and debris along this segment. Both are piles of yard waste, including a tree that has been cut into logs and a pile of leaves and yard clippings.

2.3 Upland Assessment

Fuss and O'Neill conducted upland assessments in the Tankerhoosen watershed on July 16, 2008. The field observations assist in identifying pollution prevention and potential restoration opportunities at hotspot land uses and residential neighborhoods in the watershed. Factors that were considered when determining which hotspots and neighborhood areas to prioritize for assessment include:

- Stream condition (assessed during stream corridor inventory),
- Site proximity to the stream,
- Land use type and development density,
- Land ownership,
- Restoration potential.

The assessment framework was adapted from the Unified Subwatershed and Site Reconnaissance (USSR) method developed by the Center for Watershed Protection. USSR is a "windshield survey" evaluation method in which field crews drive and walk through areas of the watershed to quickly identify pollution prevention and restoration opportunities. The three major components to the upland assessments conducted in the Tankerhoosen watershed are: hotspots, residential neighborhoods, and streets and storm drains. Field data forms that were completed during the assessments are provided in <u>Appendix B</u>.

2.3.1 Hotspot Site Investigation

Hotspot site investigations were conducted for six representative sites with a high potential to contribute polluted stormwater runoff to the storm drain system and receiving streams. The purpose of the investigation was to qualitatively assess the potential for stormwater pollution from previously identified commercial, industrial, municipal or transport-related sites. The hotspot investigation was limited in scope to representative hotspot facilities in order to evaluate and illustrate common issues. The investigation was not intended to be an exhaustive review of all potential hotspot facilities in the entire watershed nor a detailed inspection or audit of each facility, which are beyond the scope of this study.

The hotspots examined in the field were located within the Lower Tankerhoosen River, Walker Reservoir, Clarks Brook, and Gages Brook subwatersheds. Representative priority hotspots were selected to cover a range of watersheds and land uses, including three industrial sites, one commercial site, one transportation-related site, and one state/municipal site. Sites are identified by the watershed abbreviation, followed by "HSI" and a numeric identifier. <u>Table 5</u> summarizes the selected hotspots that were evaluated. Several of the sites that were investigated are privately owned, and field crews were unable to gain full access to the sites to closely evaluate the storm drainage and other site characteristics.

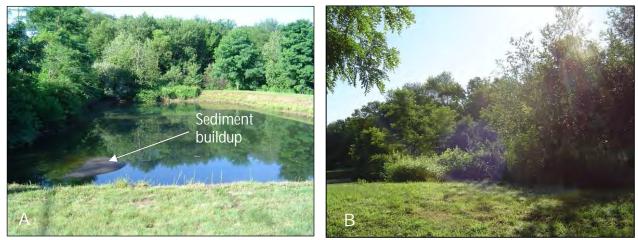
Site ID (Watershed)	Land Use Category	Description of Site Operations
GB-HSI-01 (Gages Brook)	Industrial	Industrial Park – Gerber Technologies Office Building
GB-HSI-02 (Gages Brook)	Industrial	Dari Farms Ice Cream Distribution Center
WR-HIS-01 (Walker Reservoir)	Transport-related	ConnDOT Commuter Lot
CB-HIS-01 (Clarks Brook)	Commercial	Superior Energy – Propane
CB-HIS-02 (Clarks Brook)	Industrial	Sand, gravel, construction storage/processing facility
LTR-HIS-01 (Lower Tankerhoosen River)	State/Municipal	ConnDOT Maintenance and Service Center

Table 5: Hotspot Site Investigation Summary

Gerber Technologies Office Building

The Gerber Technologies office building is located in the Tolland Industrial on Industrial Park Road West. The site is located adjacent to Gages Brook (see stream assessment discussion in <u>Section 2.2.5</u>). The office building has landscaped areas around the building with shrubs and turf lawn. The site is characterized by a large amount of impervious cover, consisting of building roof areas and parking lots. Approximately 100 vehicles were parked in the employee parking lots at the time of the inspection. Stormwater runoff from the site appears to discharge to the stormwater basin located near the southern limit of the site. The stormwater basin is a wet pond design containing a permanent pool of water and is approximately 70 feet wide by 140 feet long. The basin contained accumulated sediment captured from the site runoff. The basin outfall discharges to Gages Brook via a riprap spillway.

The stormwater basin that receives runoff from the Gerber Technologies facility incorporates many of the recommended elements to meet current stormwater quantity and quality design criteria. However, the basin is also in need of maintenance as demonstrated by the sediment accumulation near the center of the basin and the overgrown woody vegetation at the overflow spillway. Existing stormwater basins such as this one may also be good retrofit candidate to improve treatment effectiveness by incorporating a sediment forebay at the basin inlet, which may also facilitate routine sediment removal.



Stormwater basin at the Gerber Technologies facility on Industrial Park Road West. Sediment has built up near the center of the basin (A) and the basin overflow spillway is overgrown with vegetation (B).

Dari Farms Ice Cream Distribution Facility

The Dari Farms distribution facility is also located in the Tolland Industrial Park on Research Way/Gerber Drive near the divide between the Gages Brook and Gages Brook South Tributary subwatersheds. The facility is estimated to be less than 5 years old, as evidenced by the facility's modern pollution prevention site design elements including a covered fueling station, no visible outdoor storage of materials, and well maintained landscaping on the grounds. Possible pollution sources to the storm drainage system are the runoff from the large impervious areas on the site (the roof and parking areas) and potential vehicle fluids from truck fueling activities and employee vehicles. It could not be determined whether stormwater is managed on-site, by the downgradient stormwater basin near the Gerber Technologies facility, or both. The site did not appear to incorporate Low Impact Development (LID) design features such as vegetated swales or parking lot bioretention. New commercial/industrial facilities with significant impervious area, such as this one, are potential candidates for on-site LID and stormwater treatment practices to reduce runoff volume and pollutant loads.



The Dari Farms Ice Cream Distribution Facility has a covered fueling station and landscaped grounds (shown in the foreground).



ConnDOT Commuter Parking Lot

The hotspot investigation included the Connecticut Department of Transportation commuter parking lot at exit 67 of Interstate-84, which is located in the Walker Reservoir subwatershed (see stream assessment discussion in <u>Section 2.2.4</u>). Approximately 150 vehicles were parked at the lot during the site visit, which occurred on a weekday during mid-day. The site is contains significant impervious cover and high-intensity vehicle usage and is therefore a source of automobile-related stormwater pollutants including hydrocarbons, sediment, and metals. The entire parking lot drains to a double catch basin located on the southeastern side of the lot. The catch basin discharges through a short wetland corridor and subsequently to the stream segment located upstream of Reservoir Road and Walker Reservoir East. An easily accessible grass strip exists between the paved lot and the adjacent wetland and stream corridor. This site is a potential stormwater retrofit candidate (bioretention or water quality swale) to encourage infiltration and provide additional treatment for the parking lot runoff.



The southeastern side of the Interstate 86 Exit 67 commuter parking lot showing the edge of the lot on the left side of the photograph and the wetland corridor on the right side. The center of the photograph shows the easily accessible and open area for a potential stormwater retrofit.

Superior Energy

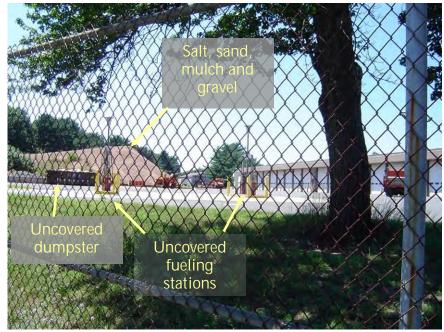
Superior Energy is a propane gas and related equipment distributor located on Hartford Turnpike (Route 30) in Vernon. The site is located within the Clarks Brook subwatershed (see stream assessment discussion in <u>Section 2.2.1</u>) near the headwaters of Clarks Brook. The property consists of a retail store, a paved parking lot for delivery trucks, and outdoor storage of propane tanks. It is unknown if vehicle maintenance or fueling occurs on-site. As described previously, the site appears to have been modified in the past through grading/filling based on an inspection of the existing site drainage and discussions with facility personnel. This site should be further investigated to better define potential impacts of the historical filling, current drainage issues, and plans for additional site development.



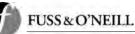
Sand & Gravel Facility The facility is located on Clark Road at the western end of Industrial Park Road and near the western limit of the Clarks Brook subwatershed. Facility operations appear to include storage and processing of sand, gravel and other construction materials. The site contains one building, which is assumed to be an office and/or maintenance area. The majority of the site consists of an unpaved yard used for the storage of sand and gravel piles and equipment to process the materials and load transport vehicles. The site contains numerous potential sources of sediment and other pollutants associated with the sand and gravel stockpiles, heavy equipment and vehicles, waste construction materials stored outdoors, and pipes and debris in the yard. Sand and gravel operations such as this should employ stormwater pollution prevention practices and source controls as required by the DEP *General Permit for Stormwater Discharges Associated with Industrial Activity*, in addition to stormwater treatment practices to reduce sediment and hydrocarbon loadings in site stormwater runoff.

DOT Maintenance Service Center

The State of Connecticut operates a Department of Transportation Maintenance Service Center for District #1 located on Campbell Avenue in Vernon, which is located in the Lower Tankerhoosen River subwatershed. The facility has an office building, garages for vehicle storage and maintenance, a small parking lot, outdoor storage of sand, salt, gravel and mulch, and an uncovered outdoor fueling station. Vehicle maintenance activities and outdoor vehicle fueling are potential sources of stormwater pollution, in addition to the outdoor stockpile storage. A rolloff dumpster was observed to be overflowing and uncovered at the time of the windshield survey. Municipal and state-operated highway maintenance facilities such as this should employ source controls, pollution prevention, and stormwater treatment practices as necessary in accordance with the DEP *General Permit for Stormwater Discharges Associated with Industrial Activity*.



ConnDOT District #1 Maintenance Service Center, Campbell Avenue



2.3.2 Neighborhood Source Assessment

Stormwater runoff from existing residential neighborhoods and future residential development in the watershed is an important consideration for this study, since approximately 40 percent of the Tankerhoosen River watershed consists of residential land use and future buildout of the watershed could result in conversion of an additional 10 percent of the watershed to residential land use. Neighborhood source assessments were conducted on July 16, 2008 to evaluate pollution source areas, stewardship behaviors, and residential restoration opportunities within individual residential neighborhoods throughout the watershed. The residential behaviors that contribute to stormwater quality were assessed by considering the following source areas for "average" neighborhoods throughout the subwatershed:

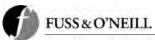
- Yards and Lawns;
- Driveways, Sidewalks, and Curbs;
- Rooftops;
- Common Areas.

Neighborhoods were selected for assessment based on their proximity to stream corridors and their overall potential to contribute pollutants to the stream. The selected neighborhoods include a variety of residential types, including low- and high-density single-family residential and multi-family residential (apartments and condos). One field sheet was completed for each neighborhood assessed. The selected neighborhoods are located in the Tucker Brook, Lower Tankerhoosen River, Clarks Brook, Walker Reservoir, and Gages Brook subwatersheds, as summarized in Table 6.

Each neighborhood was assigned a score for pollution severity and restoration potential. Pollution severity is a measure of how much nonpoint source pollution a neighborhood is likely generating based on easily observable features such as lawn care practices, drainage patterns, oil stains, etc. Restoration potential is a measure of the feasibility of on-site retrofits or behavior changes based on available space, number of opportunities, presence of a strong homeowners association, and other factors.

Neighborhood/Subdivision Name	Subwatershed	Residential Type	Pollution Severity	Restoration Potential
Mount Vernon Apartments	Walker Reservoir	Multi-family	Moderate	Moderate
Campbell Avenue	Lower Tankerhoosen River	High-density, single- family	Moderate	Low
Valley View Drive/Andrew Way	Gages Brook	Medium-density, single-family	None	Low
High Manor Mobile Home Park	Clarks Brook	High-density, single- family	Moderate	Moderate
Meadowbrook Drive	Tucker Brook	Medium-density, single-family with open space areas	None	Low

Table 6: Neighborhood Source Assessments Conducted in the Tankerhoosen River Watershed



Mount. Vernon Apartments

The Mount Vernon apartments are a 33-acre multi-family housing complex situated between Hartford Turnpike (Route 30) and Interstate 84 in the Walker Reservoir subwatershed. The apartments are served by outdoor surface parking lots in front of each building. Site imperviousness is estimated at approximately 50 percent. Runoff downspouts are connected directly to the site stormwater drainage system, and parking areas are served by traditional curb and gutter drainage. The complex is generally well-maintained, with generally clean gutters, catch basins, and parking areas. Some oil staining was observed on the pavement within individual parking stalls. The overall pollution severity is rated as moderate due to the large amount of directly connected impervious area and potential pollutant sources from parking areas. This site is a potential retrofit candidate to reduce stormwater runoff from the site, including disconnecting downspouts from the storm drainage system and redirecting them to pervious grass areas, rain barrels/cisterns, and rain gardens. Multi-family parking lots, such as the parking lots at this complex, may also be good candidates for stormwater retrofits. The following photograph depicts an existing landscaped area adjacent to the parking lot that could potentially function as a bioretention/rain garden.



The Mount Vernon apartment complex buildings showing clean and well-maintained parking areas and landscaping (A) and a landscaped area that has the potential to be used as a rain garden (B).

Campbell Avenue

The Campbell Avenue residential development is a 13-acre neighborhood of single family homes on approximately ¼ acre lots. The neighborhood is located off of Dobson Avenue and is situated between Interstate 84 and the ConnDOT Maintenance Service Center to the north and Dobsonville Pond to the south. The age of the neighborhood is estimated as approximately 50 years. Almost none of the homes has a garage, and nearly all have impervious driveways connected to the street curb and gutter drainage system. No on-site or centralized stormwater management practices were observed, other than curb and gutter drainage. Most of the homes have downspouts that are directed to pervious lawn areas near the house. Landscaping practices were minimal. This type of older, high density single family residential neighborhood has limited potential for stormwater retrofits due to limited land area.

Valley View Drive/Andrew Way

The Valley View Drive/Andrew Way neighborhood is approximately 55 acres in size and located near the headwaters of Gages Brook. The neighborhood is approximately 25 years old

and consists of single family homes occupying approximately 1-acre lots. Most of the homes have garages and a high percentage of the lots are covered by lawn (60%) and landscaped areas (20%). The subdivision is served by traditional curb and gutter drainage. No centralized stormwater management measures were observed. Approximately three quarters of the roof downspouts are connected to adjacent pervious areas. Overall, the neighborhood was rated as having low pollution potential and limited potential for stormwater retrofits.



A typical lot in the Valley View Drive/Andrew Way neighborhood.

High Manor Mobile Home Park

High Manor Mobile Home Park is an approximately 28-acre neighborhood located in the Clarks Brook subwatershed, situated between Route 30 and Interstate 84. The park is believed to have been developed in the 1970s. The average lot in the neighborhood has approximately 40 percent impervious cover, including the home and driveway, 40 percent grass cover, and 20 percent landscaped area. Approximately 90 percent of the homes have roof downspouts that discharge to lawns. The streets have traditional curb and gutter drainage, and storm drain inlets were observed to be clean. No centralized stormwater management measures were observed.



A street view of the High Manor Mobile Home Park showing turf lawns with some mature trees on the properties.



Meadowbrook Drive

The Meadowbrook Drive neighborhood is an approximately 100-acre residential neighborhood in the northeast corner of Manchester. The neighborhood is situated in the central portion of the Tucker Brook subwatershed, and Tucker Brook flows partially through and along the north and west sides of the development (see stream assessment discussion in <u>Section 2.2.7</u>). The subdivision is estimated as approximately 10 years old, and the average lot size for the single family homes in the subdivision is approximately ½ acre. All of the homes have garages. The driveway, sidewalks and curb areas are clean and dry. A majority of the homes have roof downspouts that discharge to pervious lawn areas. The street storm drains are stenciled. An approximately 1-acre wet stormwater basin near the corner of Yale and Chatham Drives receives runoff from the subdivision storm drainage system. The basin outlet discharges to Tucker Brook. At the time of the inspection the stormwater basin outlet was observed to be overgrown with vegetation, and stream bank erosion was observed at the outfall to the stream. As noted in <u>Section 2.2.7</u>, the basin appears to be in need of regular maintenance. Buffer encroachment, stream crossings, residential drain outfalls, and yard waste dumping were common in residential areas along the stream corridors in this subdivision.



Typical conditions in the Meadowbrook Drive neighborhood showing landscaping, lot sizes, and general cleanliness.

2.3.3 Streets and Storm Drain Assessment

Urban streets and storm drains can be a source of stormwater pollutants if not maintained on a regular basis. The condition of the local road and storm drain infrastructure can be assessed to determine if existing maintenance practice could reduce pollutant accumulation. Selected streets and storm drains were assessed during the upland field inventories conducted on July 16, 2008. Most of the streets and storm drains that were assessed are located in or near hotspot or neighborhood source assessment locations. Findings of the street and storm drain assessment are summarized below. Photographs of the storm drains and the street conditions evaluated are provided as <u>Table 7</u>, and the completed field forms are included in <u>Appendix B</u>.



Location	Storm	Drains	Streets
Campbell Avenue			
Mount Vernon Apartments			
Valley View Drive/Andrew Way			
High Manor Mobile Home Park			
Gerber Technologies			
Clark Road Industrial Park			[No photo]

Table 7: Streets and Storm Dr	ain Assessment Photographs
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Most of the streets were clean, free of sediment and debris, and in good condition. The one exception is Industrial Park Road in the Clark Road Industrial Park where roads were observed to be in poor condition (cracked, broken, and sediment accumulation). Storm drains along Industrial Park Road were also partially obstructed with sediment, leaves, trash, and one of the catch basins had standing water above the elevation of the stream water surface, indicating blockage of the outlet pipe. Many of the inspected catch basins had varying degrees of sediment accumulation and nearly all could benefit from increased clean-out and street sweeping. With the exception of the Meadowbrook Drive subdivision in the Tucker Brook subwatershed, none of the storm drains observed during the field assessments were stenciled.

3.0 LAND USE REGULATORY REVIEW

3.1 Introduction

Municipal land use regulations control patterns of new development and redevelopment and can play a significant role in protecting water quality and other natural resources in a watershed. These commonly include local plans of conservation and development, zoning regulations, subdivision regulations, inland wetland regulations, and stormwater regulations, all of which influence the type and density of development that can occur within a watershed. Local land use regulations often vary by town within a watershed, and regulations are periodically revised in response to development pressure, shifts in attitude toward natural resource protection, and political and socioeconomic factors.

A key element in the development of a Watershed Management Plan is to identify potential land use regulatory mechanisms (i.e., new or modified land use regulations) that can be implemented by the watershed towns to strengthen existing land use controls and better protect natural resources within the watershed. Many Connecticut communities are in the process of developing new or modified land use regulations that incorporate Low Impact Development (LID) and related stormwater management approaches to address stormwater quantity and quality objectives. Communities in urbanized areas are also faced with a mandate to meet State and Federal Phase II stormwater permit requirements under the National Pollutant Discharge Elimination System (NPDES) program, as well as addressing local concerns about the damaging effects of increased impervious cover and uncontrolled stormwater runoff from land development and suburban sprawl. An opportunity exists for the watershed towns to develop revised and/or new regulatory mechanism to satisfy Phase II stormwater requirements, while also protecting water quality and other natural resources in the Tankerhoosen River watershed.

This section summarizes the following information:

- 1. Existing municipal land use planning entities and regulations for each of the watershed communities based on information obtained from a land use questionnaire conducted by the North Central Conservation District in 2005 as part of the *Hockanum River State of the Watershed Report* (Fuss & O'Neill, 2005). The information was updated where necessary to reflect current conditions.
- 2. Existing land use regulations and related planning documents that pertain to stormwater management and natural resource protection issues, as well as potential approaches for developing regulatory mechanisms to incorporate improved stormwater

management, including LID concepts and opportunities to reduce impervious cover, into the local land use regulations. The regulatory review was performed for the towns of Tolland and Vernon because they comprise the majority of the land area in the Tankerhoosen River watershed and have the greatest potential for future development.

3.2 Summary of Municipal Land Use Planning Entities and Regulations

The 2005 land use questionnaire provided information from the watershed municipalities on the current land use regulations in each town, including information on wetlands and watercourses regulations, zoning regulations, plans of development, open space planning, and stormwater regulations. The following paragraphs summarize information obtained from the questionnaire.

Local land use regulations are administered by various Town commissions, boards, and agencies. Land use commissions in the Tankerhoosen River watershed communities are summarized below (<u>Table 8</u>).

Town	Land Use Commissions
Manchester	 Planning and Zoning Commission (acts as Inland Wetlands and Watercourses Agency) Zoning Board of Appeals
Vernon	 Planning and Zoning Commission Inland Wetlands and Watercourses Agency Conservation Commission Design Review Board Open Space Task Force
Tolland	 Planning and Zoning Commission Inland Wetlands and Watercourses Commission Conservation Commission Design Advisory Board
Bolton	 Planning and Zoning Commission Inland Wetlands Commission Conservation Commission Open Space Preservation, Acquisition, and Conservation Committee

Table 8: Tankerhoosen River Watershed Land Use Commissions

Source: Hockanum River – State of the Watershed Land Use Questionnaire, North Central Conservation District, 2005

<u>Table 9</u> summarizes the current plan of development, subdivision, inland wetlands, zoning, floodplain management, and stormwater regulations for the watershed towns. The table lists the last revision date for the applicable land use regulations.

Regulation	Manchester	Vernon	Tolland	Bolton
Plan of Development	2004	2001	1999	1990
Subdivision Regulations	2005	2007	2008	2004
Wetlands Regulations	2007	2006	2007	2006
Zoning Regulations	2008	2006	2008	2005
Floodplain Management	1994	In Zoning Regs.	None	2005
Stormwater Regulations	2004 Connecticut Stormwater Quality Manual	In Zoning Regs.	2008 (LID)	2004

Source: Hockanum River – State of the Watershed Land Use Questionnaire, North Central Conservation District, 2005

Inland Wetlands & Watercourses

Regulating activity with the potential to affect wetlands and watercourses is an essential component in preserving or improving the water quality and overall health of the Tankerhoosen River. In Connecticut, the Inland Wetlands and Watercourses Act requires that each municipality establish an Inland Wetlands and Watercourses Agency or Commission and local regulations regulating private and municipal work located in or affecting wetlands or watercourses. Each of the surveyed watershed towns has an inland wetlands agency, and each town has defined an upland review area, or distance from wetlands and watercourses that is subject to review. Three of the four watershed towns indicated that they have identified wetlands or watercourses that are impaired or that require restoration or require special protection. <u>Table 10</u> summarizes the regulating agencies, upland review areas, and identified wetlands and watercourses of special significance for the surveyed watershed towns.

Table 10: Inland Wetlands and Watercourses Regulations

Town	Regulating Agency	Upland Review Area	Wetlands and Watercourses of Special Significance
Manchester	Planning & Zoning Commission	50' wetlands and watercourses	None identified
Vernon	Inland Wetlands & Watercourses Agency	100' wetlands 200' designated watercourses	 Vernal pools on Box Mountain Road Tankerhoosen River Hockanum River Belding Preserve and Wildlife Management Areas
Tolland	Inland Wetlands & Watercourses Commission	50' wetlands 100' watercourses	Preliminary*

Town	Regulating Agency	Upland Review Area	Wetlands and Watercourses of Special Significance
Bolton	Inland Wetlands Commission, Conservation Commission	100' wetlands and watercourses	Yes*

Source: Hockanum River – State of the Watershed Land Use Questionnaire, North Central Conservation District, 2005

*Information available from the individual towns.

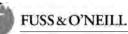
Stormwater Management and Soil Erosion and Sediment Control

Development of the landscape with impervious surfaces can alter the hydrology of a watershed and has the potential to adversely affect water quality and aquatic habitat. As a result of development, vegetated and forested land that consists of pervious surfaces is largely replaced by land uses with impervious surfaces. This transformation increases the amount of stormwater runoff from a site, decreases infiltration and groundwater recharge, and alters natural drainage patterns. Natural pollutant removal mechanisms provided by on-site vegetation and soils have less opportunity to remove pollutants from stormwater runoff. During construction, soils are also exposed to rainfall, which increases the potential for erosion and sedimentation. Development can also introduce new sources of pollutants from everyday activities associated with residential, commercial, and industrial land uses.

Stormwater runoff both during construction and following completion of construction for new development and redevelopment projects is regulated at the local and state levels. All of the watershed towns have erosion and sediment control regulations as mandated by the Soil Erosion and Sediment Control Act. Most Connecticut municipalities have adopted regulations requiring that a soil erosion and sediment control plan be submitted with any application for development within the municipality when the disturbed area of such development is more than one-half acre. Projects that disturb greater than 5 acres of land are subject to regulation under the DEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities. This permit applies to discharges of stormwater and dewatering wastewaters from construction activities including, but not limited to, clearing, grading, and excavation that result in the disturbance of 5 or more acres of total land area on a site. Pursuant to Phase II of the NPDES Stormwater Program, construction activities disturbing between 1 and 5 acres have been delegated by DEP to the municipalities provided that the erosion and sediment control plan is reviewed and receives approval from the town, under the Soil Erosion and Sedimentation Control Act.

Post-construction stormwater quantity and quality are also regulated by the watershed municipalities through municipal planning and zoning and inland wetlands and watercourses regulations. All of the watershed towns are subject to the requirements of the NPDES Phase II stormwater program, which is regulated under the DEP General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 General Permit). The MS4 General Permit regulates the quality of municipal stormwater discharges and requires the creation of a Stormwater Management Plan that addresses the following six minimum control measures:

1. Public education and outreach on storm water impacts required throughout the entire municipality;



- 2. Public involvement/participation required throughout the entire municipality;
- 3. Illicit discharge detection and elimination required throughout the entire municipality including mapping all storm water discharges from a pipe or conduit with a diameter of 15 inches or greater (or equivalent cross-sectional area) owned or operated by the municipality;
- 4. Construction site storm water runoff control required throughout the entire municipality;
- 5. Post-construction storm water management in new development and redevelopment; and
- 6. Pollution prevention/good housekeeping for municipal operations.

The DEP *Connecticut Stormwater Quality Manual* provides guidance on the measures necessary to protect the waters of the State of Connecticut from the adverse impacts of post-construction stormwater runoff. It is intended for use as a planning tool and design guidance document by the regulated and regulatory communities involved in stormwater quality management in Connecticut. The manual provides uniform guidance for developers, engineers, and review agencies on the selection, design, and application of stormwater control measures. All of the watershed towns in the Tankerhoosen River watershed have indicated that they use the stormwater manual in reviewing development proposals for stormwater management issues.

The Town of Tolland recently (February 2008) amended its zoning and subdivision regulations to require that Low Impact Development (LID) techniques be implemented on all development to protect high quality wetlands, watercourses, open water bodies and other sensitive areas from the impacts of point and nonpoint sources of stormwater due to land development projects. Tolland also developed a companion LID design manual.

Open Space

Open space plays a critical role in protecting and preserving the health of a watershed by limiting development and impervious coverage, preserving natural pollutant attenuation characteristics, and supporting other planning objectives such as farmland preservation, community preservation, and passive recreation. Open space includes preserved natural areas as well as lightly developed parks and playgrounds. While approximately 40 percent of the Tankerhoosen River watershed consists of undeveloped land uses, much of this land is not considered open space because it may be privately owned and ultimately developed. Protected open space areas include deeded open space that is privately owned, parcels owned by land trusts, state and federally-owned land, land owned by water companies, and municipal park land. Such land is protected against future development. Each of the watershed towns has prepared an open space plan for their respective communities (<u>Table 11</u>).

Town	Open Space Plan
Manchester	2004
Vernon	2002
Tolland	2006
Bolton	2004

Table 11. Status of Municipal Open Space Plans in the Tankerhoosen River Watershed

Source: Hockanum River – State of the Watershed Land Use Questionnaire, North Central Conservation District, 2005

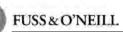
In addition to the designation of protected open space through donation, purchase of land by a town, conservation or land trusts, or other private and/or public agencies, towns also require that some land be dedicated as open space with the development of new subdivisions. The subdivision regulations of all of the towns in the Tankerhoosen River watershed require the set aside of a percentage of new subdivisions as open space, and all but Manchester have provisions for fee-in-lieu-of open space. <u>Table 12</u> summarizes responses from the surveyed watershed communities regarding their current open space regulations.

A majority of the surveyed watershed towns also allow "cluster development" and "open space subdivisions" in their subdivision regulations. These are compact forms of development that concentrate density in one portion of the site in exchange for reduced density elsewhere, thereby reducing overall site imperviousness and associated stormwater impacts and potentially avoiding development in sensitive areas of a site.

Town	Allow 'Cluster'	Allow 'Open Space'	Subdivision Open Space	
TOWIT	Development	Subdivisions	Required	Fee in lieu of
Manchester	Yes	No	Yes, 6%	No
Vernon	Yes	No	Yes	Yes
Tolland	Yes	Yes	Yes, 10%	Yes
Bolton	Yes	Yes	Yes	Yes

Table 12.	Open	Space	Regulations
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Source: Hockanum River – State of the Watershed Land Use Questionnaire, North Central Conservation District, 2005



3.3 <u>Summary of Existing Regulations and Preliminary Recommendations</u>

The following policy, regulatory and planning documents were reviewed for the towns of Vernon and Tolland relative to stormwater management and natural resource protection:

- Subdivision Regulations,
- Zoning Regulations,
- Inland Wetland and Watercourses Regulations,
- Plan of Conservation and Development/Open Space Plan.

3.3.1 Town of Vernon

The Town of Vernon has a number of land use regulations that regulate construction and post-construction stormwater runoff from new development and redevelopment activities, and provide for protection of natural resources. The local regulations are particularly strong in terms of erosion and sediment control (as well as consistent between the various regulations), open space protection, and regulating activities that can potentially affect wetlands and watercourses, including requirements for watercourse buffers. However, there are several areas where the regulations and design standards and guidance could be strengthened through amendments or new regulations to clarify and strengthen stormwater management requirements and better promote the use of LID principles.

This section contains preliminary recommendations for the town of Vernon based on the review of the existing land use regulations and planning documents. The recommendations in this section are a summary of the more detailed regulatory review, which is provided in a technical memorandum dated June 9, 2008 (Appendix D).

1. Town Design Manual

- Develop a Town stormwater and LID design manual. A local manual should reference applicable sections of the Connecticut Stormwater Quality Manual to take advantage of the existing design guidance, but also include more detailed guidance and stronger emphasis on LID practices and include specific stormwater standards tailored to the characteristics and needs of the Town (see Recommendation 2). The Town land use regulations should also reference the local stormwater design manual, thereby serving as a single, unifying guidance document that could be updated without the need for major revisions to the land use regulations.
- Include a section of the design manual that addresses stormwater retrofits for redevelopment and drainage system upgrade and maintenance projects. Stormwater retrofits for residential and commercial redevelopment projects are an important element for the Town's stormwater management strategy given the level of existing development in the Town. Stormwater retrofits also present an opportunity to implement lot-level LID strategies as opposed to larger end-of-pipe controls where land may not be available for stormwater management facilities.
- Incorporate/reference stormwater quantity and conveyance sections of the Connecticut DOT Drainage Manual for consistency with state drainage standards.

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2. Stormwater Management Standards

- Develop and incorporate into the Town stormwater design manual a set of stormwater management standards, which would become regulatory standards referenced by the existing Town land use regulations and/or new stormwater ordinance (see Recommendation 3). Development of stormwater management standards would allow Vernon to establish clearer, specific standards that all projects must meet in order to obtain local land use permits. The stormwater standards could include LID requirements, complement the hydrologic sizing criteria in the *Connecticut Stormwater Quality Manual* and be tailored (using variable minimum performance standards) to protect specific water bodies or sensitive resources in the Town of Vernon. An example set of stormwater management standards is included with the full memorandum in <u>Appendix D</u>.
- 3. New or Modified Stormwater Regulations
 - Develop and implement new or revised stormwater regulations to 1) satisfy Phase II Stormwater Program regulatory requirements, 2) encourage or require LID principles to be implemented for development projects in Vernon, and 3) address other local drainage and natural resource protection issues identified by the Town. Two potential approaches have been identified –1) a new stand-alone stormwater ordinance, or 2) addition/amendments to the existing Zoning Regulations.
 - Form an advisory committee or workgroup consisting of representatives from the various land use commissions and selected Town departments to further evaluate and select the best approach for Vernon, including key decisions regarding:
 - If a new, stand-alone stormwater ordinance is selected, which department or commission will have responsibility for administering the program (i.e., the "Stormwater Authority")?
 - Which projects and activities will the new ordinance apply to (i.e., applicability)?
 - o How will applications be received and reviewed?
 - Who will be responsible for inspections and enforcement?
 - Will additional staff be required to handle the increased workload to review and process applications?

3.3.2 Town of Tolland

Zoning and Subdivision Regulations

The Town of Tolland recently amended its zoning and subdivision regulations to:

- 1. Incorporate Low Impact Development (LID) principles. The Town also developed a companion LID Design Manual that provides recommendations for site design, road design, and stormwater management.
- 2. Create a natural Resource and Wildlife Protection Overlay Zone around sensitive habitat areas and steep slopes throughout the town.
- 3. Adopt density-based zoning to replace the minimum lot size requirements.

Tolland is one of the first towns in Connecticut to adopt comprehensive LID regulations. The regulations are a good model for the other watershed communities to require the use of LID practices. The regulations are currently in the early stages of implementation. The Town should continue to monitor the effectiveness of the LID regulations as development projects subject to the new regulations are designed, reviewed, and constructed.

Consistent with the recommendations for the Town of Vernon, Tolland should also consider adopting a River Protection Overlay District for the Tankerhoosen River (Gages Brook). Such a district would establish a contiguous and parallel buffer strip on either side of the river and would supplement the underlying zoning regulations, with the added provision that the land within the buffer areas and the river itself would remain in a natural, undisturbed state.

Inland Wetlands and Watercourses Regulations

The Inland Wetlands and Watercourses regulations were amended in 2007, and are in accordance with the Connecticut General Statues. The regulations define an Upland Review Area extending a minimum 50 feet from the edge of a wetlands and/or watercourse and a extending a minimum of one hundred 100 feet from any watercourse, including intermittent watercourses. The width of the Upland Review Area may be doubled in cases where the slopes bordering the wetland and/or watercourse are in excess of 15%, the presence of highly erodible soils, or unique and/or easily damaged wetland ecosystems exist.

Permit application requirements include documentation that proposed stormwater quality management systems, at a minimum, conform to the "2004 Connecticut Stormwater Quality Manual", as amended. The Inland Wetlands and Watercourses Regulations should be revised to require that projects also meet the design requirements contained in the Tolland LID Design Manual, for consistency with the zoning and subdivision regulations and to promote the use of LID. The town should also consider incorporating more explicit watercourse buffer requirements, including minimum buffer widths, similar to the watercourse buffer provisions in the Town of Vernon Inland Wetlands and Watercourses Regulations.

Plan of Conservation and Development

The Tolland Planning & Zoning Commission is in the process of updating the 1999 Plan of Conservation & Development (POCD) in accordance with the Connecticut General Statutes which requires the plan to be updated every ten years. The plan will establish a common vision for the future of the community and determine policies that will help attain that vision. The plan will address a range of themes, including natural resources, open space, utility infrastructure, and community development.

The Town's planning consultant has prepared draft recommendations related to conservation issues as part of the POCD update process. The recommendations address surface and groundwater quality, important habitat areas, drainage issues, green infrastructure, and open space protection. Some of the key recommendations for natural resource protection that also apply within the Tankerhoosen River watershed include (Planimetrics, 2008):

• Future development should occur in a manner and in locations that are environmentally sustainable,

• Impacts from existing development should be minimized through education, incentives, and town leadership.

Open Space and Conservation Plan

The 2006 Tolland Open Space and Conservation Plan inventoried natural resources throughout the town, including wetlands, rivers and streams, lakes and ponds, vernal pools, water supply watersheds, forest resources, and wildlife resources. In addition to the Open Space and Conservation Plan, the town has also completed or is implementing the following open space preservation activities (Planimetrics, 2008):

- Establishing an Open Space Acquisition Fund,
- Setting up a structured process for open space procurement and management,
- Promoting the use of open space, with trail maps and programmed activities,
- Tapping into a volunteer group for maintenance (Tolland Conservation Corps).



4.0 REFERENCES

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APPENDIX A

Stream Corridor Assessment Field Forms and Data

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Average	CONDITIONS (check	k applicable)	REACH S	SKETCH AND SI	TE IMPACT TI	ACKING
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	☑ 50%-75% □ 75-100%	Simple planar sketch o within the survey rea features a	f survey reach. Tra ch (OT, ER, IB,SC, leemed appropriate.	UT, TR, MI) as w	ell as any additi
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5	slick) 🗹 Col 🗆 Bo	bble (2.5 –10") ulder (>10") l rock				
	☑ Clear □Turbid aturally colored) □ (dyes)					
AQUATIC PLANTS IN STREAM	Attached: ☑ none Floating: ☑ none					
WILDLIFE IN OR AROUND STREAM	(Evidence of) ☐ Fish ☐ Beave ☐ Snails ☐ Other:					
STREAM SHADING (water surface)	☐ Mostly shaded (2 ☑ Halfway (≥50%) ☐ Partially shaded ☐ Unshaded (< 25%	(≥25%)			Bolton	Road
CHANNEL DYNAMICS	 Downcutting Widening Headcutting Aggrading Sed. deposition 	Bed scour Bank failure Bank scour Slope failure Channelized			50	to the second
CHANNEL DIMENSIONS	Height: LT bank RT bank	$\frac{3}{3}$ (ft)		 The second second	ŝ. ()	\Box
(FACING DOWNSTREAM)	Width: Bottom Top	(ft)			A A	
R	EACH ACCESSIBILIT			· •))	A d
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.	Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from	Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.			(C	LNKC -
5 4 NOTES: thiggest prot		1]			$\left[\underbrace{\zeta_{L}}{} \right]$

	Optimal	Suboptimal	Marginal	Poor
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lac of habitat is obvious; substrate unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streamban surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetatio has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	$(2) \cdot 1 0$
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to propert or infrastructure.
	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	20 19 18 17 16 OVER	15 (14) 13 12 11 ALL BUFFER AND FLOODPLAI	10 9 8 7 6	5 4 3 2 1 0
	Optimal	Suboptimal	1	
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Marginal Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Poor Width of buffer zone <10 feet: littl or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetatio type is turf or crop land
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
FLOODPLAIN Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
		Minor floodplain encroachment in the	Moderate floodplain	Significant floodplain
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures 20 19 18 17 16	form of fill material, land development, or manmade structures, but not effecting floodplain function	encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function 10 9 8 7 6	encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function 5 4 3 2 1 0

				Storm Water	Outfalls	ΟΤ
WATERSHED/SUBSH	ED: Clarly	Brook	DATE: 7 / 8	/ <u>Asses</u>	SED BY: F	riends
SURVEY REACH ID:	CBON TI	ME: 10 :48 AM/PN			/# 10	(2403)
SITE ID (Condition-#):	от- <u>03</u> L		2" LONG 72-072			PS: (Unit ID)
BANK: DLT RT Head FLOW: None Trickle	TYPE:	MATERIAL:	Metal 🗹 Circular 🗌		IONS: <u>1% (in)</u>	SUBMERGED:
Moderate Substantial Other:	Dpen channel	Concrete Ea	arthen Trapezoid Parabolic Other:	Depth: Width (Top): " (Bottom):	<u></u>	NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: M No Gas Sewage	DEPOSITS/STAINS	S: VEGGIE DENSI	Brown Other:	Orange	, <u></u>
Corrosion	Sulfide	Paint Other:	Infinited Excessive Other:	Good [ALITY: 21 Odors 00 Algae 11	Colors 🗍 Oils
FOR COLOR: Clear Brown Grey Yellow Green Orange Red Other: FLOWING ONLY TURBIDITY: None Slight Cloudiness Cloudy Opaque FLOATABLES: None Sewage (toilet paper, etc.) Petroleum (oil sheen) Other: OTHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Sedimentation CONCERNS: Needs Regular Maintenance Bank Erosion Other:						
POTENTIAL RESTOR	ATION CANDIDAT	E Discharge inves	stigation 🗌 Stream daylig ofit 🔹 🗌 Other:	ghting 🗌 Local stre	am repair/out	fall stabilization
If yes for daylighting.		Anna ann ann ann ann ann ann ann ann ann		· · · · · · · · · · · · · · · · · · ·		
Length of vegetative co	ver from outfall:	ft Type of	of existing vegetation:	W	Slope:	o
If yes for stormwater. Is stormwater currently	controlled?		Use description: wailable:			
SEVERITY: Ca (circle #) St	eavy discharge with a dis trong smell. The amount of ompared to the amount of tream; discharge appears gnificant impact downstre	of discharge is significant normal flow in receiving to be having a	Small discharge; flow mostly or discharge has a color and/or or discharge is very small compar flow and any impact appears to	dor, the amount of red to the stream's base be minor / localized.	discharge; stain of causing any e	have dry weather ing; or appearance erosion problems.
SKETCH/NOTES:	3	4	3	2		
- ALL CALING LES.						
)				REPORTED TO	AUTHORITIES	S: 🗌 YES 🗌 NO

			Sto	orm Water Outfalls	OT
WATERSHED/SUBSH	ED: Clarks	Brook	DATE: 7/2/6	28 ASSESSED BY:	Friends
SURVEY REACH ID:	CBO T	IME: <u>10</u> : <u>50</u> AM/PI	M PHOTO ID: (Camera-H		(2404)
SITE ID (Condition-#):	OT- <u>0부</u> L	AT 049.57,	1 "LONG 72 ° 27 ' 20.2	" LMK (GPS: (Unit ID)
BANK: LT MRT Head FLOW: None Trickle	Closed	MATERIAL:	SHAPE: □ Single Metal ☑ Circular □ Double Brick □ Elliptical □ Triple □ Other: □		SUBMERGED
Moderate Substantial Other:	Open channel	Concrete E E		Depth: <u>(in)</u> Width (Top): <u>(in)</u> " (Bottom): <u>(in)</u>	NOT APPEICABL
CONDITION: None Chip/Cracked Peeling Paint Corrosion	ODOR: ☑ No □Gas □ Sewage □Rancid/Sour □ Sulfide	DEPOSITS/STAIN	☐ None ☐ Normal ☐ Inhibited ☐ Excessive	PIPE BENTHIC GRO	e Green No pool
Other:	Other:	Other:	Other:	Suds Algae	
CONCERNS: Ne		nance 🔲 B	ank Erosion 🗌 Other:	■ Local stream repair/or	utfall stabilizatic
<i>If yes for daylighting</i> Length of vegetative co		ft Type	of existing vegetation:	Slope:	0
If yes for stormwater Is stormwater currently	controlled?		Use description:available:		
SEVERITY: S (circle #) S	leavy discharge with a dis trong smell. The amount o ompared to the amount o tream; discharge appears ignificant impact downstre	of discharge is significant f normal flow in receiving to be having a	Small discharge; flow mostly clear and discharge has a color and/or odor, the a discharge is very small compared to the flow and any impact appears to be mino	mount of discharge; sta	ot have dry weather ining; or appearance y erosion problems.
·	5		4 3	2	1
SKETCH/NOTES:					
) 				REPORTED TO AUTHORITI	ES: YES N

				Stor	m Water	Outfalls	OT
WATERSHED/SUBSH	ed: Clarks	Brook		DATE: 7 / 02 /08	Asse	SSED BY: 🖓	riends
SURVEY REACH ID:	CBDI I	'IME: 10 : 37 AM/Pi	М	PHOTO ID: (Camera-Pie	c #)	1# 8	(2401)
SITE ID (Condition-#):	OT L	AT 110 49 . 59	<u>.6</u> " Lo	NG- <u>12 ° 27 ' 20.4</u> "	LMK	G	PS: (Unit ID)
BANK: LT RT Head FLOW: None Trickl Moderate	Closed	MATERIAL:		SHAPE: □ Single ☑ Circular □ Double □ Elliptical □ Triple □ Other:	DIMENS Diameter	SIONS: r: <u></u>	SUBMERGED:
Substantial	Open channel	Concrete E	Earthen	Parabolic W	epth: idth (Top): (Bottom):		NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: ☑ NO □Gas □ Sewage □Rancid/Sour	DEPOSITS/STAIN		VEGGIE DENSITY:		THIC GROW	/TH: None
Corrosion	Sulfide	Paint Other:		 Inhibited Excessive Other: 	Good 🗌	JALITY: Odors Algae	Colors Oils
ONLY FLOA OTHER Ex CONCERNS: No POTENTIAL RESTOR no If yes for daylighting	:	ne Sewage (toilet lastic bags) D enance B TE Discharge inve Storm water ret	paper, et Dumping (ank Eross estigation rofit	(bulk)	Sedimentatio	on eam repair/out	
Length of vegetative co	ver from outfall:	ft Type	of existir	ng vegetation:		Slope:	0
If yes for stormwater Is stormwater currently	controlled?		Use desc available:				
SEVERITY: C (circle #)	ompared to the amount o tream; discharge appear ignificant impact downstr	of discharge is significant of normal flow in receiving s to be having a	discharge discharge	charge; flow mostly clear and od e has a color and/or odor, the am e is very small compared to the st any impact appears to be minor /	ount of ream's base	discharge; stair	t have dry weather ning; or appearance erosion problems.
SKETCH/NOTES:	5		4	3		2	
A A A A A A A A A A A A A A A A A A A							
1				R	EPORTED TO) AUTHORITIE	S: YES NO

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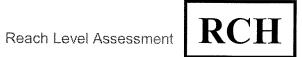
Storm Water Outfalls

0	T
Ŭ	-

WATERSHED/SUBSHED: Clarks Broch			DATE: 7/2/08 ASSESSED BY: Friends			
SURVEY REACH ID:	CBOI TI	ME: <u> }</u> AM/PM	Рното ID: (Camera-Pic #) /# 9 (2402)			
SITE ID (Condition-#):	OT LA	л <u>Ч1°Ч9 '55,%</u> "L	ONG <u>72° 27 ' 20.5</u> " LMK GPS: (Unit ID)			
BANK: LT RT Head FLOW: None Trickl	Closed	MATERIAL: Concrete Metal PVC/Plastic Brick Other:	SHAPE: Single Circular Double Elliptical Triple	DIMENSIONS: SUBMERGED:		
Moderate Substantial Other:	Dpen channel	Concrete Earthen	Parabolic Wi	idth (Top): (in) NOT APPEICABLE (Bottom): (in) NOT APPEICABLE		
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: D NO Gas Sewage Rancid/Sour Sulfide Other:	DEPOSITS/STAINS: None Oily Flow Line Paint Other:	VEGGIE DENSITY: None Normal Inhibited Excessive Other:	PIPE BENTHIC GROWTH: None Brown Orange Green Other: Other: POOL QUALITY: No pool Good Odors Colors Suds Algae Floatables Other: Other:		
FOR COLOR: Clear Brown Grey Yellow Green Orange Red Other: FLOWING ONLY TURBIDITY: None Slight Cloudiness Cloudy Opaque FLOATABLES: None Sewage (toilet paper, etc.) Petroleum (oil sheen) Other: OTHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Sedimentation ONCERNS: Needs Regular Maintenance Bank Erosion Other:						
POTENTIAL RESTOR	RATION CANDIDATI	Discharge investigatio	on Stream daylighting Other:	Local stream repair/outfall stabilization		
If yes for daylighting		THE STREET STREET	······································			
Length of vegetative co	over from outfall:	ft Type of exis	ting vegetation:	Slope:°		
If yes for stormwater Is stormwater currently Yes No N	controlled?	Land Use des Area availabl	1			
SEVERITY: (circle #)	Heavy discharge with a dist strong smell. The amount of compared to the amount of stream; discharge appears significant impact downstreat	f discharge is significant normal flow in receiving to be having a	lischarge; flow mostly clear and ode ge has a color and/or odor, the amo ge is very small compared to the str d any impact appears to be minor /	ount of ream's base localized.		
	5	4	3	2 (1)		
SKETCH/NOTES:			Ri	EPORTED TO AUTHORITIES: 🗌 YES 🔲 NO		
1						

Stream Crossing

r								
WATERSHED		nou		DATE: 7	12 108	ASSE	SSED BY: Frilnels	
URVEY REA	CONTRACTOR AND	1	_AM/PM): (Camera-Pic	#)	1# 12 (2405)	
SITE ID: (Con	dition-#) SC- <u>O</u> L LAT	41049.51	<u> </u>	120271	<u>20.2"</u> LN	/IK	GPS (Unit ID)	
						-		
TYPE: 🗹 Roa	d Crossing 🗌 Railroad Crossin		1		Geological Form	nation	Other:	
For Road/ Railroad	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS:	MATERIAL: Concrete Metal Other:	Fic	NMENT: ow-aligned of flow-aligned o not know	Barrel dia	Height:(ft)	
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	 Downstream Failing emb 		Fla	VERT SLOPE: at ght $(2^{\circ} - 5^{\circ})$ vvious $(>5^{\circ})$		mgth: <u>57</u> (ft) Width: (ft) elevation: (ft)	
	Unter (<i>describe</i>):					Roadway		
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re	moval 🗹 Culv	/ert repair/re	placement 🔲 U	pstream st	orage retrofit	
🗌 no		Local stream r			Ĩ.	larist	Destant	
IS SC ACTING	G AS GRADE CONTROL		es 🗌 Unk					
	EXTENT OF PHYSICAL BLO	CKAGE:		BLO	CKAGE SEVER	ITY: (circ	le #)	
If yes for fish barrier	EXTENT OF PHYSICAL BLOCKAGE: Total Partial Temporary Unknown CAUSE: Drop too high Water Drop: (in) Flow too shallow Water Depth: (in)		A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.				A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.	
<u></u>	Other:		5		4 3		2 (1)	
NOTES/SKET	· ·							
)					REPORT	דיי א מד	THORITIES 🗌 YES 🗌 NO	
					ALL UKI	LU TO AUI		



SURVEY REACH I	n. c. Ros		•	n	ASSE	SSED BY:
<u>) na stanta se </u>		rshd/Subshd: C	14. 4	DATE: <u>7/ 2</u>	F.	riends
	E: <u>]]:07</u> AM/PM		END TIME:_		LMK:	GPS ID:
	58,0" LONG	12°27 '202"	LAT	<u>0.7</u> " Long <u>/</u>	2007 260	<u></u>
DESCRIPTION:			DESCRIPTION:			
RAIN IN LAST 24 HO	UPS - Heavy rain	□ Steady rain	PRESENT CONDITIONS		□ Ct++ 1+	
□ None		•		5 □ Heavy rain □ Trace	\Box Overcast	n □ Intermittent ☑ Partly cloudy
SURROUNDING LAN			Urban/Residential			\Box Institutional
	□ Golf cou	rse 🗆 Park	□ Crop	\square Pasture	\Box Other:	
Average	CONDITIONS (che	ck applicable)	REACH	SKETCH AND SI	ГЕ ІМРАСТ ТІ	ACKING
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	□ 50%-75% □ 75-100%	within the survey re	each (OT, ER, IB,SC,	UT, TR, MI) as w	
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5	ATE slick) 🖾 Co 🗆 B	obble (2.5 -10") oulder (>10") ed rock	_ features	e deemed appropriate.	Indicate directio	on of flow
WATER CLARITY Stained (clear, no) Other (chemicals, state)			- - -			
AQUATIC PLANTS IN STREAM		e \square some \square lots e \square some \square lots				
Wildlife in or Around Stream	(Evidence of) ☐ Fish ☐ Beav ☐ Snails ☐ Other	er 🗌 Deer				
STREAM SHADING (water surface)	 ✓ Mostly shaded □ Halfway (≥50% □ Partially shaded □ Unshaded (< 25 	ó) I (≥25%)	 تۇرىيى			
CHANNEL DYNAMICS	Downcutting Widening Headcutting Aggrading Sed. deposition	Bed scour Bank failure Bank scour Slope failure Channelized	uner and for the second	TR-01		.,
CHANNEL DIMENSIONS (FACING DOWNSTREAM)	Height: LT bank RT bank Width: Bottom Top		Under of	i sc-1		
R	EACH ACCESSIBILI	ГҮ	.2			
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.	Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.	Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.	String - di		07-1 > AA	
5 4 NOTES: (biggest prob		2 1 reach)			1502	мил.».
)	icin you see in survey	i cuchij				
n an the second s						
		م الله الم		Repor	TED TO AUTHOF	

	Optimal	Suboptimal	Marginal	Poor	
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble		
	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0	
	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0	
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use. Bast downcutting evider stream widening, banks eroding at a moderate ra threat to property or infrastructure		Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.	
	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN Connection	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched. 20 19 18 17 16	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	
		15 14 13 12 11 ALL BUFFER AND FLOODPLAI	10 9 (8) 7 6	5 4 3 2 1 0	
	Optimal	Suboptimal	Marginal	Poor	
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land	
	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0	
FLOODPLAIN Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0	
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function	
	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0	

Storm Water Outfalls OT							
WATERSHED/SUBSH	ED: Clarks	Brook	DATE	71210	Assessed	BY: Fr	iends
SURVEY REACH ID:		ме: <u>//</u> :/5_{М/рі	м Рнот	0 ID: (Camera-P		1# 16,	(2000)
SITE ID (Condition-#):	ОТ- <u>//</u> Ца	<u>т41°49,58</u>	<u> 3'' Long72</u>	027 120.1	" LMK	GI	PS: (Unit ID)
BANK: / LT RT Head FLOW: None Trickl Moderate	Closed	MATERIAL:	Brick Elli	cular Double ptical Triple er:	Diameter:_@		SUBMERGED: No Partially Fully
Substantial	Open channel	Concrete E E	arthen I Tra	abolic y	Depth: Vidth (Top): " (Bottom):		NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: NO Gas Sewage Rancid/Sour	DEPOSITS/STAIN None Oily Flow Line	S: VEGG	mal	Other:] Orange	Green
Corrosion	Sulfide	☐ Paint ☐ Other:		essive	POOL QUALI Good O Suds A Other:	dors 🔲 🤇	Colors 🗌 Oils
ONLY FLOA OTHER E: CONCERNS: N	IDITY: None TABLES: None Access Trash (paper/pla eeds Regular Mainten	e Slight Cloudin e Sewage (toilet astic bags) D ance B	ess Cloud paper, etc.) Dumping (bulk) ank Erosion	ly Depaque Petroleum Excessive Other:	Orange Red	C Othe	r:
POTENTIAL RESTOR		E Discharge inve			Local stream	repair/out	fall stabilization
Length of vegetative co		ft Type	of existing vege	tation:	S	Slope:	o
If yes for stormwater Is stormwater currently	controlled?		Use description: available:				
SEVERITY: (circle #)	Heavy discharge with a dist strong smell. The amount of compared to the amount of tream; discharge appears ignificant impact downstrea	f discharge is significant normal flow in receiving to be having a	discharge has a co discharge is very s	ow mostly clear and o olor and/or odor, the ar mall compared to the s ct appears to be minor	nount of disc stream's base of a	charge; stain	have dry weather ing; or appearance erosion problems.
SKETCH/NOTES:	5		4	3	2		1
~ 							
)		******		I	REPORTED TO AU	THORITIES	S: YES NO

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				S	Storm Water C	Dutfalls	ΟΤ
WATERSHED/SUBSH	ED: Clark	s Brook	I	DATE: 7/2/	08 Assess	ED BY:	
SURVEY REACH ID:	CB02	TIME: 11 : 52 AM/P	M I	Рното ID: (Camera	a-Pic #)	1#20	(2413)
SITE ID (Condition-#):	ОТ	LAT 41 ° 50 '01.				1	PS: (Unit ID)
	<u></u>						
BANK: LT RT Head FLOW: None Trickl	Closed	MATERIAL:]Metal []Brick [SHAPE: Singl Circular Dou Elliptical Trip Other:	ible	5115.	SUBMERGED:
Moderate Substantial Other:	Open channel	Concrete E E		☐ Trapezoid ☐ Parabolic ☐ Other:	Depth: <u>4</u> Width (Top): <u>(</u> " (Bottom):		NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: IN Gas Sewage	age Dily id/Sour Flow Line		VEGGIE DENSITY: None Normal Inhibited	Brown Other:	HIC GROW	
Corrosion	Sulfide	Paint Other:] Excessive] Other:	Good C	Good Odors Colors Oi Suds Algae Floatables	
FOR COLOR: Image: Clear Brown Grey Yellow Green Orange Red Other: FLOWING ONLY TURBIDITY: Image: None Slight Cloudiness Cloudy Opaque FLOATABLES: Image: None Sewage (toilet paper, etc.) Petroleum (oil sheen) Other:							
	ccess Trash (pape eeds Regular Mai		oumping (b ank Erosio	·	ive Sedimentation		
POTENTIAL RESTOR	ATION CANDID	ATE Discharge inve		Stream daylighting	g 🗌 Local stream	m repair/outf	all stabilization
If yes for daylighting	•						
Length of vegetative co	over from outfall:	ft Type	of existing	g vegetation:		_ Slope:	o
If yes for stormwater Is stormwater currently	controlled?		Use descri	ption:			
OUTFALL H SEVERITY: S (circle #) S	leavy discharge with a trong smell. The amou ompared to the amou tream; discharge app ignificant impact dowr	a distinct color and/or a unt of discharge is significant nt of normal flow in receiving ears to be having a nstream.	Small disch discharge h discharge is	harge; flow mostly clear an has a color and/or odor, th s very small compared to the hy impact appears to be m	e amount of the stream's base	discharge; staini	have dry weather ing; or appearance prosion problems.
SKETCH/NOTES:					L		I
					Duponer -		
) <u></u>				•	REPORTED TO A	NUTHORITIES	. U YES U NO

Ctown	Matan	M. Manua
SIOUU	vvalei	Outfalls

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WATERSHED/SUBSHED: Clarks			DATE: 712 108 Assessed BY: Friends					
SURVEY REACH ID: CB OL TIME 2 :08 AM/PM		Рното ID: (Camera-Pic #) /# 2						
SITE ID (Condition-#): OT- <u>03</u> LAT <u>41 ° 50 '0313</u> "LO			<u>-</u> " Lo	ong72 • 27 · 23,3 " LMK GPS: (Unit ID)				
BANK: LT RT Head FLOW: None Trickle	TYPE: Closed pipe	MATERIAL:	Metal Brick	SHAPE: Single Circular Double Elliptical Triple Other: Triple	Double No			
Moderate Substantial Other:	Open channel	Concrete Ea	arthen	Parabolic W	Pepth: <u>(in)</u> /idth (Top): <u>(in)</u> " (Bottom): <u>(in)</u>			
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: 🗹 No Gas Sewage Rancid/Sour Sulfide Other:	DEPOSITS/STAINS	s:	VEGGIE DENSITY: None Normal Inhibited Excessive Other:	PIPE BENTHIC GH Brown Ora Other: POOL QUALITY: Good Odors Suds Algae Other:	nge 🔲 Green		
FOR COLOR: Clear Brown Grey Yellow Green Orange Red Other: FLOWING TURBIDITY: None Shight Cloudiness Cloudy Opaque ONLY FLOATABLES: None Sewage (toilet paper, etc.) Petroleum (oil sheen) Other: OTHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Sedimentation CONCERNS: Needs Regular Maintenance Bank Erosion Other: PoterNTIAL RESTORATION CANDIDATE Discharge investigation Stream daylighting Local stream repair/outfall stabilization If yes for daylighting: If yes for daylighting: Excessive Sedimentation Other:								
SEVERITY: stron (circle #) strea	ntrolled? nvestigated y discharge with a dis g smell. The amount of	Land U Area a stinct color and/or a of discharge is significant f normal flow in receiving t o be having a	Use desc available Small dis discharg discharg	cription:	dorless. If the nount of tream's base	es not have dry weather staining; or appearance any erosion problems.		
	5	4	1	3	(2)	1		
SKETCH/NOTES:				R	Reported to Author	ITIES: 🗌 YES 🗌 NO		

				ŝ	Severe B	ank Erc	osion	ER
WATERSHED/SUBS	SHED: Clarks	Brook		DATE: 7_/_2	108	ASSES	SED BY:	Friends
SURVEY REACH:	CBO2	TIME: 1) :	30_A)M/PM	PHOTO ID (CAI	MERA-PIC #	<i>t</i>)·	1# 19	(2412)
SITE ID: (Condition-	#) START LAT	1050.01.2	" LONG 72 ° 2	7 120.4 11	LMK		$\frac{\mathbf{GPS}_{t}}{\mathbf{GPS}_{t}}$	Init ID)
ER-01	END LAT_	0 1	" LONG°	1 11	LMK		GI Di (c	//// 1D)
	Currently unknown	BANK OF CO	DNCERN: 🗹 LT [RTBoth (looking dow	nstream)		1.0.1
Downcutting	Bed scour	DIMENSIONS	Meander bend	Straight section		slope/valle	ey wall [_] Other:
	Bank failure		GPS) LTft	and/an DT	م	Dette	. 1/1	0
Headcutting	Bank scour	Bank Ht	LTft	and/or RT	n	Bottor Ton w	n width _	ft
Aggrading	Slope failure	Bank Angle	LT	and/or PT	îi	T op w	d Width	R
Sed. deposition	Channelized	7						Π
LAND OWNERSHIP	Private Public	Unknown	LAND COVER:	Forest .	Field/Ag		oped:	
POTENTIAL RESTO	DRATION CANDIDATE	: Grade		Bank stabilizatio	n			
THREAT TO PROP	ERTY/INFRASTRUCT	JRE: 🖸 No	Yes (Describ	e):				
EXISTING RIPARIA	N WIDTH:	□ ≤25 ft	25 - 50 ft] 50-75ft 🗌 75	-100ft	□ >100ft	t	
EROSION	Active downcutting; tall ban		Pat downcutting evide	nt octivo stroom				
SEVERITY(circle#)	of the stream eroding at a fa contributing significant amore		widening, banks active	ely eroding at a				eas of bank bipe outfall, local
Channelized= 🗌 1	stream; obvious threat to prinfrastructure.		moderate rate; no thre infrastructure	eat to property or				or adjacent use.
	5		4 3	(2)		1	
ACCESS: Good access: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or					o access stre	eam. Minimal ated a great		
	trails.		4 Stockpile areas small	or distant from stream.	equipment			
NOTES/CROSS SEC			+3)			1	
,								
)					REPORTE	D TO AUTH	IORITIES	Yes 🗌 No

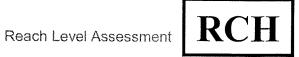
Stream Crossing

					Tegawari-				
WATERSHED/SUBSHED: Clarks DATE: 7/2/08 ASSESSED BY: Friends									
URVEY REACH ID: CBO2 TIME: 12:15 AM/PM PHOTO ID: (Camera-Pic #) /# 22(2415)									
SITE ID: (Condition-#) SC- 01 LAT 41									
TYPE: Roa	d Crossing 🔲 Railroad Crossi	ing 🔲 Manmade I	Dam 🗌 Beav	er Dan	n 🗖	Geological Forr	nation 🗖	Other: Parking	104
For Road/ Railroad	SHAPE: # BARRELS: Arch Bottomless Box Elliptical Circular Triple Other: Other:		Concrete		ALIGNMENT: Flow-aligned Not flow-aligned Do not know		DIMENSIONS: (if variable, sketch) Barrel diameter:(ft) Height:(ft)		
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosio Sediment deposition Other (describe):	n 🗌 Downstrean 🗌 Failing emb	n scour hole ankment	CULVERT S		ght (2° – 5 ⁰)	Culvert length: <u>400</u> Width: Roadway elevation: <u>13</u>		_(ft) _(ft) (ft)
POTENTIAL F	RESTORATION CANDIDATE	Fish barrier re	moval 🗌 Culv	vert rep	air/rep	lacement \Box [Jpstream st	torage retrofit	
🗹 no		Local stream 1		-	F			0	
IS SC ACTING	G AS GRADE CONTROL	No Ye	es 🗌 Unk	nown		3" 8"	18"		
	EXTENT OF PHYSICAL BLC	OCKAGE:	r		BLO	CKAGE SEVEF	RITY: (circ	le #) 🤇	
If yes for fish barrier	 ☐ Total ☐ Partial ☐ Temporary ☐ Unkno CAUSE: ☐ Drop too high Water D ☐ Flow too shallow Water D ☐ Other: 	rop: (in)	A structure such road culvert on a greater stream bl upstream movern anadromous fish; passage device p	3rd orde locking thent of then fish present.	er or ne	A total fish blocka tributary that woul significant reach o or partial blockage interfere with the anadromous fish.	ld isolate a of stream, e that may	A temporary barrier such beaver dam or a blockat the very head of a streat very little viable fish hab above it; natural barriers as waterfalls.	ge at m with bitat
NOTES/SKET			5		4	3		2 1	
)						Repor	FED TO AUT	THORITIES 🗌 YES 🗌	<u>] No</u>

Trash and Debris

WATERSHED/SUB		DATE: 7 / 2	-108	ASSESSED BY: Friends				
JURVEY REACH ID: CBO2 TIME: 12:35 AM/PM			Рното ID: (Ca	mera-Pic #)	1# 24 (2417)			
SITE ID: (Condition	-#) TR-<u>01</u> LAT <u>4</u>	1 . 50 . 07.5 " LON	<u>G72°27 '22.9</u>	<u>72°27'22.9</u> " LMK GPS: (Unit ID)				
TYPE: ✓ Industrial ☐ Commercial ✓ Residential	Appliances Ya	aper I Metal Instruction I Medical ard Waste applicance ther: 55 gal drum	SOURCE: Unknown Flooding Illegal dump Local outfall	LOCATION: Stream Riparian Are Lt bank Rt bank				
POTENTIAL RESTORATION CANDIDATE Stream cleanup Stream adoption segment Removal/prevention of dumping no Other:								
If yes for trash or debris removal	EQUIPMENT NEEDED : Heavy equipment Trash bags Unknown DUMPSTER WITHIN 100 F WHO CAN DO IT: Volunteers Local Gov Hazmat Team Other Ves No Unknown							
CLEAN-UP POTENTIAL: (Circle #)	A small amount of trash (i.e., less than two pickup truck loads) located inside a park with easy access than two pickup truck loads) located inside a park with easy access							
<u>(5)</u> <u>4</u> <u>3</u> <u>2</u> <u>1</u> NOTES:								
` <u>)</u>				REPORTED	D TO AUTHORITIES 🗌 YES 🗌 NO			

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SURVEY REACH		rrshd/Subshd: 🔍	arks Brook	DATE: 7/2	<u>107</u> Asse	SSED BY: FILMOLS
8-A	е: <u>12</u> : <u>45</u> ам/рл		END TIME:_	:AM/PM	LMK:	GPS ID:
Lat <u>4 ° 50 '</u>	07" LONG 7	2 0 27 123.9 "	LAT''	" Long		
DESCRIPTION:			DESCRIPTION:			
					• • • • • • • • • • • • • • • • • • •	
RAIN IN LAST 24 HO		□ Steady rain	PRESENT CONDITIONS		-	
None					Overcast	Partly cloudy
SURROUNDING LAN		l □ Commercial rse □ Park	□ Urban/Residential □ Crop	□ Suburban/Res □ Pasture	☑ Forested □ Other:	□ Institutional
AVERAGE	CONDITIONS (che		•	SKETCH AND SIT	Real Providence and the second	ACKING
BASE FLOW AS %	□ 0-25%	□ 50%-75%				IDs for all site impacts
CHANNEL WIDTH	□25-50 %	₽ 75-100%		each (OT, ER, IB,SC, deemed appropriate.		
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5	slick) □ C I B	obble (2.5 –10") oulder (>10") ed rock		ucontes appropriate.	marcule un cene	
WATER CLARITY	aturally colored) 🛛		-			
AQUATIC PLANTS		e \Box some \Box lots				
IN STREAM		e 🗆 some 🗆 lots				
WILDLIFE IN OR AROUND STREAM	(Evidence of) ☑ Fish □ Beav □ Snails □ Othe					
STREAM SHADING (water surface)	 ✓ Mostly shaded □ Halfway (≥50% □ Partially shaded □ Unshaded (< 25 	5) I (≥25%)				Bolinersc 03
CHANNEL	Downcutting	Bed scour				
DYNAMICS	Widening	Bank failure				J.
_	Headcutting	Bank scour				
Unknown	Sed. deposition				1-1-	3-3002
	Height: LT bank	(ft)				- 01
CHANNEL DIMENSIONS	RT bank	(ft)	for the second		Fron sc	
(FACING	Width: Bottom	(ft)		en de J	V	
DOWNSTREAM)	Тор	$\frac{5}{15}$ (ft)		1. 1.		$\langle \cdot \rangle$
p	LEACH ACCESSIBILI			1 - 1 - 1	and the second s	N N
Good: Open area in	Fair: Forested or	Difficult. Must cross	1 V	/ /+- 0`	10	
public ownership,	developed area adjacent to stream.	wetland, steep slope, or				
sufficient room to stockpile materials,	Access requires tree	sensitive areas to get to stream. Few areas to	t the			
easy stream channel	removal or impact to	stockpile available	5			
access for heavy equipment using	landscaped areas. Stockpile areas	and/or located a great distance from stream.				
existing roads or trails.	small or distant from stream.	Specialized heavy				
5 4	and the second sec	equipment required.	19 10 10 10 10 10 10 10 10 10 10 10 10 10			
NOTES: (biggest prob	olem you see in survey	reach)	(M) A			
)						
	·····			REPOR	FED TO AUTHOR	RITIES YES NO

	Optimal	Suboptimal	Marginal	Poor		
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.		
	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.		
	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.		
	20 19 18 17 16	<u>15 14 13 12(11)</u>	10 9 8 7 6	5 4 3 2 1 0		
		ALL BUFFER AND FLOODPLA				
	Optimal	Suboptimal	Marginal	Poor		
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.		
	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	<u>(5)</u> 4 3	2 1 0		
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land		
	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water		
	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0		
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function 10 9 8 7 6	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function 5 4 3 2 1 0		
	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6			

				Sto	rm Water	Outfalls	OT
WATERSHED/SUBSH	ed: Clarke	; Broch		DATE: 7/2/0	(Asses	SSED BY:	Friends
SURVEY REACH ID:	CB03 T	IME: <u>/2_:55_</u> AM/@	4)	Рното ID: (Camera-P	ic #)	/# 2	7 (2421)
SITE ID (Condition-#):	0T- <u>01</u> L	AT <u>41 ° 50 '11.3</u>	<u>_"</u> Lo	DNG72 027 123.4	" LMK_		GPS: (Unit ID)
BANK:	Түре:	Mampa			D		CUDA (ED CED)
LT RT Head		MATERIAL:	Metal	SHAPE: Single	DIMENS	IONS:	SUBMERGED: \square No
FLOW:	Closed pipe	PVC/Plastic	Brick	🗌 Elliptical 🔲 Triple	Diameter	: <u>(in)</u>	Partially
None Trickl	e	Other:		Other:			Fully
Substantial	🗹 Open	Concrete E	arthen		Depth: <u>3-1</u>		NOT APPEICABLE
Other:	channel	Other:			Vidth (Top): " (Bottom):		NOI APPESCABLE
CONDITION:	ODOR: NO	DEPOSITS/STAIN	s:	VEGGIE DENSITY:	T		WTH: None
☐ None ☐ Chip/Cracked	☐Gas ☐ Sewage			None Normal	Brown Other:	🗌 Orang	e 🔲 Green
Peeling Paint	Rancid/Sour	Flow Line				ALITY:	No pool
Corrosion	Sulfide	Paint		Excessive	Good	Odors [Colors Oils
					U Suds	_] Algae [_	Floatables
	DR: Cle IDITY: Nor TABLES: Nor	ne 🛄 Slight Cloudin	ess	Yellow Green C Cloudy Opaque Stc.) Petroleum		Red 🗌 Ot	
1	ccess Trash (paper/p eeds Regular Mainte		umping ank Ero	(bulk) Excessive	Sedimentatio	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	
POTENTIAL RESTOR	ATION CANDIDAT	F Discharge inve	stigatio	n 🗌 Stream daylighting			
🗌 no		Storm water retr		Other:		ani repan/o	utian staomzation
If yes for daylighting		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
Length of vegetative co	over from outfall:	ft Type	of exist	ing vegetation:		Slope:	<u>ە</u>
If yes for stormwater	•						
Is stormwater currently	controlled? ot investigated		Use des available	cription:			
OUTFALL	leavy discharge with a dis	stinct color and/or a					
(circle #)			discharç discharç	ischarge; flow mostly clear and o ge has a color and/or odor, the an ge is very small compared to the s d any impact appears to be minor	nount of stream's base	discharge; st	not have dry weather aining; or appearance ny erosion problems.
	5	۷	1	3		2	1
SKETCH/NOTES:							
)				F	REPORTED TO	AUTHORIT	IES: 🗌 YES 🗌 NO

				Stor	rm Water	Outfalls	OT			
WATERSHED/SUBSHE	D: Clarks	s Brook	D	DATE: 71 2 108 ASSESSED BY: Friends						
SURVEY REACH ID: (TIME: 1 :06 AM/P	м Р	PHOTO ID: (Camera-Pic #) /# 2 %						
SITE ID (Condition-#): C	от- <u>02</u>	Lat <u>41 ° 50 '12</u> .	🁌 '' Lond	<u>72027 17.2</u>	' LMK_		GPS: (Unit ID)			
BANK: LT RT Head FLOW: None Trickle	□ Trickle □ Tri]Metal []Brick [SHAPE: Single DIMENSIONS Circular Double Elliptical Triple Other:			SUBMERGED: No Partially Fully			
Moderate Substantial Other:			^{arthen}	Parabolic W	epth: /idth (Top): ' (Bottom):		NOT APPEICABLE			
CONDITION: None Chip/Cracked Peeling Paint	Gas INone Gracked Sewage ☐Oily			'EGGIE DENSITY: None Normal Inhibited	Brown Other:	🗌 Orang	WTH: Mone e 🔲 Green			
Corrosion Other:	Sulfide Other:	fide Paint] Inhibited] Excessive] Other:	POOL QUALITY: No pool Good Odors Colors O Suds Algae Floatables Other:		Colors Oils			
	иту: []	None 🔄 Slight Cloudin None 🔄 Sewage (toilet r/plastic bags) 🔹 D	ness	ulk) 🗌 Excessive	(oil sheen)	🗌 Ot				
POTENTIAL RESTORA	TION CANDID	ATE Discharge inve] Stream daylighting [] Other:	Local stre	eam repair/o	utfall stabilization			
<i>If yes for daylighting:</i> Length of vegetative cover	er from outfall:	ft Type	e of existing	vegetation:		Slope:	0			
If yes for stormwater: Is stormwater currently c Yes No Not			Use descrip available:	ption:						
SEVERITY: stro (circle #) stre	ng smell. The amo	nstream.	discharge had discharge is flow and any	arge; flow mostly clear and or as a color and/or odor, the am very small compared to the s y impact appears to be minor ,	ount of tream's base / localized.	Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems.				
SKETCH/NOTES:		5	4	3		2	1			
SALICH/INTES.										
				R	EPORTED TO	O AUTHORIT	IES: 🗌 YES 🗌 NO			

				\$	Severe B	ank Erosio	n	ER
	HED: Clarks 1			DATE: 7/2	108	ASSESSED	BY:	Friends
SURVEY REACH:	CB03	TIME:	3 AM/PM	Рното ID (CA	MERA-PIC 7	#): /	# ~	19 2424
SITE ID: (Condition-	#) START LAT	1 050 13.1	" LONG 72 02	7124"	LMK	GP		nit ID)
<u>ER- 2 </u>	END LAT	<u> </u>	" Long°	1 11	LMK			,
Downcutting Widening	Currently unknown	LOCATION: DIMENSION		Straight section	Steep :	slope/valley w		
Headcutting	Bank scour	Length (if no	<i>GPS)</i> <u>LTft</u>	and/or RT	ft	Bottom wi	dth _	ft
Aggrading	Slope failure	Bank Ht	LT <u> </u>	and/or RT	ft	Top width		ft
Sed. deposition	Channelized	Bank Angle	GPS) LT <u>30</u> ft LT <u>20</u> ft LT	° and/or RT	°	Wetted Wi	idth _	ft
LAND OWNERSHIP	: Private Public	C Unknown	LAND COVER	Forest	Field/Ag	Developed	:vua	r ind pk.
🗌 No	DRATION CANDIDATE	Other			'n		<u></u>	
THREAT TO PROPI	ERTY/INFRASTRUCTU	URE: 🗌 No	🗌 Yes (Describ	pe): 2				
EXISTING RIPARIA	N WIDTH:	⊠ <u>≤</u> 25 ft	□ 25 - 50 ft [] 50-75ft [] 7:	5-100ft	□ >100ft		
EROSION SEVERITY(circle#) Channelized= 1	Active downcutting; tall band of the stream eroding at a fa contributing significant amou stream; obvious threat to pre infrastructure.	ast rate; erosion unt of sediment to	Pat downcutting evide widening, banks activ moderate rate; no thre infrastructure	ely eroding at a	failure/ero	d width stable; isol sion; likely caused paired riparian veg	i by a p	ipe outfall, local
ACCESS:	5 Good access: Open area in ownership, sufficient room to materials, easy stream char heavy equipment using exis trails.	n public o stockpile nnel access for ting roads or	l	ccess requires tree	other sens stockpile a distance fr equipment		ess stre d/or loc	am. Minimal ated a great
NOTES/CROSS SEC			43		2	1		
)"					Reporte	D TO AUTHOR	ITIES [Yes 🗌 No

Stream Crossing

[· · · · · · · · · · · · · · · · · · ·						0 4		L	
WATERSHED		Snoch		DAT		12/08		SSED BY: Frill	
A CARDON PROVIDEN CARD AND AND AND AND AND AND AND AND AND AN	<u>CHID: 7803</u>		_AM/PM	Рно	TO ID	: (Camera-Pic	: #)	/# 31(2	,f
SITE ID: (Con	dition-#) SC LAT	no osignal	''LONG	°	<u> </u>	" LI	MK	GPS (Unit IL))
TYPE: 🗌 Roa	d Crossing 🔲 Railroad Cross	ing 🔲 Manmade I	Dam 🗌 Beav	er Dan	n 🔲	Geological Form	nation 🗌	Other:	cidge_
FOR ROAD/ RAILROAD	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS: Single Double Triple Other:	MATERIAL:		Flo	MENT: w-aligned flow-aligned not know	Barrel dia	Height:	(ft) (ft)
CROSSINGS ONLY	CONDITION. (Evidence of)				CULVERT SLOPE: \Box Flat \Box Slight (2° – 5°) \Box Obvious (>5°)			width:	(ft) (ft) (ft)
BOTENTIAL I					• /	1 T T	т.,	. ~.	· · · · · · · · · · · · · · · · · · ·
	RESTORATION CANDIDATE	Local stream 1	dr.	-	-	lacement □l IVI de	bris	torage retrofit	
IS SC ACTING	G AS GRADE CONTROL	No Ye	es 🗌 Unk	nown					
	EXTENT OF PHYSICAL BL		F		BLO	CKAGE SEVER	ITY: (circ	le #)	
If yes for fish barrier	Flow too shallow Water I	own Drop:(in)	A structure such road culvert on a greater stream bl upstream movern anadromous fish, passage device p	3rd orde ocking ti nent of no fish	er or he	A total fish blocka tributary that woul significant reach o or partial blockage interfere with the anadromous fish.	d isolate a of stream, e that may	A temporary barrier s beaver dam or a bloc the very head of a str very little viable fish h above it; natural barri as waterfalls.	kage at eam with abitat
<u>)</u>	Other:		5		4	3		2) 1	
NOTES/SKET	CH:								
ť			······			REPOR	FED TO AU	THORITIES 🗌 YES	□ No

Stream Crossing

[SUBSHED. Clarks	snot						L	
WATERSHED	SC BSHED:		(1) ((5))	DAT		12/08		SSED BY:	the second se
URVEY REA	See and the second s		_AM/PM			: (Camera-Pic		/#	
SITE ID: (Con	dition-#) SC LAT	41° 50'17	<u>2"</u> Long	<u>~~</u> ~	<u> </u>	<u>17:4</u> " Li	MK	GPS	(Unit ID)
TYPE: Roa	ad Crossing 🔲 Railroad Crossi	ng 🗌 Manmade	Dam 🗌 Beau	er Dan	n 🗖 (Geological Form	nation 🗖	Other	
FOR ROAD/	SHAPE: Arch Bottomless Box Elliptical Circular	# BARRELS:	MATERIAL: Concrete Metal Other:		ALIGNMENT: ☐ Flow-aligned ☐ Not flow-aligned ☐ Do not know CULVERT SLOPE: ☐ Flat ☐ Slight (2° – 5 ⁰) ☐ Obvious (>5°)		DIMENS Barrel dia	IONS: (if v	ariable, sketch) 4,5 (ft) (ft)
RAILROAD CROSSINGS ONLY	Other: CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	ing/corrosion Downstrear sition Failing emb					Culvert le	ength: Width: elevation:	<u>(</u> (ft) (ft) <u>2∂(ft</u>
POTENTIAL I	POTENTIAL RESTORATION CANDIDATE Fish barrier removal Culvert repair/replacement Upstream storage retrofit Image: Dot in the image: Dot								
IS SC ACTING	G AS GRADE CONTROL		es 🗌 Unk	nown	61	ą			
	EXTENT OF PHYSICAL BLO	CKAGE:			BLOG	CKAGE SEVER	RITY: (circ	le #)	
If yes for fish barrier	Total Partial Temporary Unknow	vn 1005: (in)	A structure such road culvert on a greater stream b upstream moven anadromous fish passage device p	3rd orde locking the nent of no fish present.	eror	A total fish blocka tributary that woul significant reach o or partial blockage interfere with the anadromous fish.	d isolate a of stream, e that may	beaver dan the very he very little vi	y barrier such as a n or a blockage at ad of a stream with able fish habitat atural barriers such ls.
NOTES/SKET	CH:		J			<u>></u>		2	I
r						REPOR	FED TO AU	THORITIES	Yes No

Stream Crossing

***	$\langle \rangle \rangle \rangle \rangle \rangle \langle 2 $						
WATERSHED	14° 23	mole		ATE:	12108		SSED BY: Friends
URVEY REA		<u>TIME: 2:00</u>			D: (Camera-Pie		<u>/# 33 (2423)</u>
SITE ID: (Con	dition-#) SC- <u>03</u> LAT	<u>11° 50 '30</u>	<u>.2" Long 72</u>	<u></u> '	<u>04.1</u> " L	MK	GPS (Unit ID)
TYPE: TYPE: TYPE:	d Crossing 🔲 Railroad Crossi	ng 🗌 Manmade	Dam 🔲 Beaver I	Dam 🔲	Geological For	nation 🔲	Other:
For Road/ Railroad	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS:	MATERIAL: Concrete Metal Other:		NMENT: ow-aligned of flow-aligned o not know	Barrel dia	Height:(ft)
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	n 🔲 Downstrear		Fla	CULVERT SLOPE: Flat Slight $(2^{\circ} - 5^{\circ})$ Obvious $(>5^{\circ})$		ength: / 00 (ft) Width: (ft) elevation: 25 (ft)
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re	emoval 🗌 Culvert repair 🔲 Other:	repair/re	placement 🔲 I	Jpstream s	torage retrofit
IS SC ACTING	G AS GRADE CONTROL	MN₀ □Y	es 🗌 Unknov	vn			
	EXTENT OF PHYSICAL BLO	CKAGE:		BLO	CKAGE SEVEI	RITY: (circ	le #)
If yes for fish barrier	Total Partial Temporary Unknow CAUSE: Drop too high Water Dr Flow too shallow Water Dr Other:	A structure such as a road culvert on a 3rd greater stream blocki upstream movement anadromous fish; no passage device prese	order or ng the of fish	tributary that wou significant reach or partial blockag th interfere with the		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.	
	·						
1					Repor	TED TO AU	THORITIES YES NO

Trash and Debris

TR

WATERSHED/SUB	WATERSHED/SUBSHED: Clarks Brook			108	ASSESSED BY: Friends			
JURVEY REACH I	D: (B03	TIME: <u>23</u> AM/PM	PHOTO ID: (Ca	mera-Pic #)	1# 30 (2425)			
SITE ID: (Condition	#) TR-01_LAT4	<u>0 50 13.1</u> "LONG	372027 123	'' LMK	GPS: (Unit ID)			
TYPE: Industrial Commercial Residential		nstruction	SOURCE: Unknown Flooding fillegal dump Local outfall	LOCATION: Stream Riparian Ar Lt bank Rt bank				
POTENTIAL REST		Stream cleanup 🔲 Strea	um adoption segment	Removal/pr	evention of dumping			
If yes for trash or	EQUIPMENT NEEDED :	Heavy equipment T	rash bags 🖵 Unkno	wn	DUMPSTER WITHIN 100 FT:			
debris removal	WHO CAN DO IT:							
CLEAN-UP POTENTIAL: (<i>Circle</i> #)	A small amount of trash (i.e., than two pickup truck loads) loc inside a park with easy access		hay have been dumped or it could be cleaned up in	ver A large amour area, where ac	nt of trash or debris scattered over a large ccess is very difficult. Or presence of drums of hazardous materials			
NOTES:	5	4	3	2	1			
NULES.								
)	******			Reported	D TO AUTHORITIES YES NO			

R Reach Level Assessment SURVEY REACH ID: CB04 ASSESSED BY: Brook DATE: 7/10/08 WTRSHD/SUBSHD: Clarks Trance END TIME: /2 : O2 AM/PM TIME: 10 : 34 AM/PM START LMK: GPS ID: LMK: LAT 41050 132.1" LONG72027 10/2" LAT 4 050 153.9" LONG 72 026 158.6" DESCRIPTION: MUHLET TO Sodye DESCRIPTION: road avassing, knotweed m-f rose TUSSOck winterberry sensifice, Skunk i euce RAIN IN LAST 24 HOURS Heavy rain □ Steady rain PRESENT CONDITIONS □ Heavy rain □ Steady rain □ Intermittent □ None **Intermittent** □ Trace Clear □ Trace □ Overcast □ Partly cloudy SURROUNDING LAND USE: Urban/Residential Suburban/Res □ Commercial □ Forested □ Institutional \Box Golf course □ Park □ Crop □ Pasture Dother: 1-84 **AVERAGE CONDITIONS** (check applicable) **REACH SKETCH AND SITE IMPACT TRACKING** Simple planar sketch of survey reach. Track locations and IDs for all site impacts 0-25% □ 50%-75% **BASE FLOW AS %** within the survey reach (OT, ER, IB,SC, UT, TR, MI) as well as any additional □25-50 % ☑ 75-100% CHANNEL WIDTH features deemed appropriate. Indicate direction of flow DOMINANT SUBSTRATE ☑ Cobble (2.5 –10") □ Silt/clay (fine or slick) \Box Boulder (>10") □ Sand (gritty) □ Gravel (0.1-2.5") □ Bed rock WATER CLARITY I Clear I Turbid (suspended matter) □ Stained (clear, naturally colored) □ Opaque (milky) \Box Other (chemicals, dyes) Rockledge Attached: \square none \square some \square lots AQUATIC PLANTS IN IN STREAM Floating: \square none \square some \square lots SCO2 07-01 (Evidence of) WILDLIFE IN OR Fish 🗆 Beaver 🗆 Deer AROUND STREAM Snails Other: Songbirds, Prog \square Mostly shaded (\geq 75% coverage) STREAM SHADING \Box Halfway (>50%) POIL-(water surface) \Box Partially shaded (>25%) \Box Unshaded (< 25%) Downcutting Bed scour CHANNEL Widening Bank failure DYNAMICS Headcutting Bank scour Aggrading Slope failure Unknown Sed. deposition Channelized Height: LT bank (ft) CHANNEL RT bank DIMENSIONS (ft) (FACING 4 Width: Bottom (ft) DOWNSTREAM) Top (ft) REACH ACCESSIBILITY Fair: Forested or Difficult. Must cross Good: Open area in developed area wetland, steep slope, or public ownership, adjacent to stream. sensitive areas to get to sufficient room to Access requires tree stream. Few areas to stockpile materials, stockpile available removal or impact to easy stream channel landscaped areas. and/or located a great access for heavy Stockpile areas distance from stream. equipment using small or distant from Specialized heavy existing roads or trails. equipment required. stream. 5 4 1 NOTES: (biggest problem you see in survey reach)

REPORTED TO AUTHORITIES YES NO

· · · · · · · · · · · · · · · · · · ·	Optimal	Suboptimal	Marginal	Poor	
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient). subtrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).		Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0	
	Right Bank 10 (9).	8 7 6	5 4 3	2 1 0	
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.	
	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0	
	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0	
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	
		ALL BUFFER AND FLOODPLAI		5 4 3 2 1 0	
	Optimal	Suboptimal	Marginal	Poor	
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.	
	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0	
	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0	
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land	
	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water	
	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function	
	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	

Stream Crossing

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WATERSHED	/SUBSHED: Clarks B	roole		D 1 7	~ ~	110 105	1.00	Tre's	<u> </u>
	CHD: CBOH		АМ/РМ		the second second second second	<u>110 108</u>		SSED BY: Frien	<u>()</u>
and the second	CARL MARKED AND AND AND A SALES AND A		$\frac{2}{1000}$ " Long $\frac{1}{1000}$			Ch 2		/# 5 CPS (11 : 17)	
SHE ID. (Con	amon-#) SC LAI	1 30 11	LONG /	<u> </u>	<u>× v</u>	<u> 20.7</u> Li	ИК	GPS (Unit ID)	
TYPE: 🗹 Roa	d Crossing 🔲 Railroad Crossin	ng 🔲 Manmade I	Dam 🗌 Beav	er Da	m 🗌	Geological Forr	nation	Other: Forost R	load
	SHAPE:	#BARRELS :	MATERIAL:	T		NMENT:		IONS: (if variable, ske	
	Arch Bottomless	Single	Concrete			w-aligned	Barrel dia	ameter: <u>4</u>	_(ft)
FOR ROAD/	\square Emptical \square Circular	Double	Metal			t flow-aligned not know		Height:	_(ft)
RAILROAD	Other:	Other:						. 50	
CROSSINGS ONLY	CONDITION: (Evidence of)					ERT SLOPE:	Culvert le	ength: <u>50</u> Width:	(ft) (ft)
	Cracking/chipping/corrosior Sediment deposition				Fla	ght $(2^{\circ} - 5^{\circ})$		widui.	_(II)
	Other (<i>describe</i>):	Failing emb	ankment			vious (>5°)	Roadway	elevation: $\underline{O-3.5}$	(ft)
	L					1	· · · · · · · · · · · · · · · · · · ·		
	RESTORATION CANDIDATE	Fish barrier re			pair/rej	olacement 🔲 U	Jpstream st	torage retrofit	
⊠ no		Local stream 1					· · · · · · · · · · · · · · · · · · ·		
IS SC ACTING	G AS GRADE CONTROL		es 🗌 Unk	nown		. .			
	EXTENT OF PHYSICAL BLO	CKAGE:			BLO	CKAGE SEVER	UTY: (circ	le #)	
	Temporary Unknow	vn	A structure such road culvert on a			A total fish blocka tributary that woul		A temporary barrier suc	
If yes for	CAUSE:		greater stream bl	ocking		significant reach o	of stream,	beaver dam or a blocka the very head of a strea	am with
fish barrier		op: <u>3,5</u> (in)	upstream movem anadromous fish;		sh interfere with the			very little viable fish hat above it; natural barrier	
	Flow too shallow Water De	epth: (in)	passage device p	present.		anadromous fish.	-	as waterfalls.	
	Other:		5		4	3		2 1	
NOTES/SKET	CH:								
I									
ر	· · · · · · · · · · · · · · · · · · ·					REPOR	<u>red to</u> au	THORITIES 🗌 YES 🛛]No

Stream Crossing SC

N/ CORDONIED	anna Alala Bal		7		-			
WATERSHED		~	DATE: <u>7</u>			SED BY: Friends		
URVEY REA		مصلما المراجع المراجع		: (Camera-Pie		/#		
SITE ID: (Con	dition=#) SC-02 LAT 4 ° 50 '53	~ 7 " LONG <u>7</u>	<u> </u>	<u>5016</u> " L	MK	GPS (Unit ID)		
TYPE: Ros	ad Crossing 🗌 Railroad Crossing 🔲 Manmade	Dam 🗌 Beaver	Dam []	Geological For	nation \Box (Other:		
	SHAPE: #BARRELS:	MATERIAL:		NMENT:		ONS: (if variable, sketch)		
	\square Arch \square Bottomless \square Single	Concrete		w-aligned	Barrel diar			
T	Box Elliptical Double	Metal		t flow-aligned		Height:(ft)		
FOR ROAD/ RAILROAD	Circular Triple	Other:	[⊿´Do	not know	-	(10)		
CROSSINGS	CONDITION: (Evidence of)	<u> </u>	CULV	ERT SLOPE:	Culvert ler	ngth:(ft)		
ONLY	Cracking/chipping/corrosion Downstream	m scour hole	⊡ Fla	t	٧	Width:(ft)		
	Sediment deposition			ght $(2^{\circ} - 5^{\circ})$				
	Other (<i>describe</i>):		ОЪ	vious (>5°)	Roadway e	elevation:(ft)		
		emoval 🗌 Culver		olacement 🔲 🛛	Jpstream sto	orage retrofit		
	Local stream							
IS SC ACTING	G AS GRADE CONTROL \square Y	es 🗌 Unkno						
	EXTENT OF PHYSICAL BLOCKAGE:		BLO	CKAGE SEVER	RITY: (circle	e #)		
	$\Box Temporary \qquad \Box Tuknown$	A structure such as		A total fish blocka		A temporary barrier such as a		
If yes for		greater stream block		tributary that wou significant reach		beaver dam or a blockage at the very head of a stream with		
fish barrier	CAUSE:	upstream movemen anadromous fish; no	nt of	or partial blockag interfere with the	e that may	very little viable fish habitat		
	Flow too shallow Water Depth: (in)	passage device pres		anadromous fish.		above it; natural barriers such as waterfalls.		
· · · · · · · · · · · · · · · · · · ·	Other:	5	2	l 1 3		2 1		
NOTES/SKET	сн:							
<u> </u>				Repor	TED TO AUT	HORITIES YES NO		

Storm	Water	O.	ittall	0
SIOUU	vvaler		Juan	S

Image: LT Image: RT image				Storm Water Out	falls O'I '
SURVEY REACH D: C O TIME: 150 AM/rM PHOTO D: Camera-Pic #) /# 7 STTE ID (Condition-#): OT-0 Lat ¹ + 50 AM/rM PHOTO D: Camera-Pic #) IMK GPS: GPS: (Unit ID) BANK: DT (Condition-#): OT-0 Lat ¹ + 50 AM/rM SILE SILE IMK GPS: (Unit ID) BANK: DT (Condition-#): OT-0 Lat ¹ + 50 AM/rM SILE SILE IMK GPS: (Unit ID) BANK: DT (Condition-#): OT-0 MAFERIAL: SILE SILE SILE IMAFERIAL: SILE SILE Outer: IMAFERIAL: MAFERIAL: SILE SILE IMAFERIAL: IMAFERIAL: SILE IMAFERIAL: IMAFERIAL: SILE SILE IMAFERIAL: IMAFERIAL: <tdimaferial:< td=""> IMAFERIAL:</tdimaferial:<>	WATERSHED/SUBSHEI	· Clarkes	Srool	DATE: 7 / 10 / 08 ASSESSED	BY: Friends
STEE ID (Condition=#): OT-D LAT ⁴ L * D \$23:5 "LONG 72* 26 /25 * 52.6" LMK GPS: (Unit ID) BANK: DIMENSIONS: SUBMERCED: SUBMERCED: SUBMERCED: SUBMERCED: LT DRT Head TYPE: MATERIAL: STAPE: Single DIMENSIONS: SUBMERCED: None Trickle Dohen: Other: Other: Other: Dimeter, 20 (in) Partially Other: Open Concrete Earthen Drapezoid Depth: (in) Partially Moderate Substantial Open Concrete Earthen Drapezoid Depth: (in) NOT #PEGANE Other: Open Concrete Earthen Drapezoid Depth: (in) NOT #PEGANE None CONDITION: Open Open Concrete Barthen Other: ''Botomal Botomal	SURVEY REACH ID: (CB 04 TI		······································	
ILT ØRT Head ØClosed ØCconcrete Metal Circular Double Ønetal Partially None Ørige Other: Ørige Other: Partially Moderate Open Ocnerete Earthen Trapezoid Depth: (in) Partially Other: Open Ocnerete Earthen Parabolic Width (Top): (in) Nor Americate Other: (in) ODOR: None DepositrS/STAINS: VEGGIE DENSITY: Provide Concrete Other: (in) None Peling Paint Gas None DefositrS/STAINS: VEGGIE DENSITY: Provide Order Other: Other: <td>SITE ID (Condition-#): O</td> <td>T-<u>0</u> LA</td> <td>NT41050 153.5</td> <td></td> <td>r~/</td>	SITE ID (Condition-#): O	T- <u>0</u> LA	NT41050 153.5		r~/
Moderate Open Concrete Earthen Trapezoid Depth:	LT ART Head	Closed	Concrete	tal □ Circular □ Double ck □ Elliptical □ Triple Diameter: 12	∐No (in) □ Partially
□ None □ Gas □ None □ None □ Brown □ Orange □ Green □ Peeling Paint □ Rancid/Sour □ Flow Line □ Inhibited □ Dumping □ Other:	Moderate Substantial	1 -		Parabolic Width (Top):	(in) NOT APPEICABLE
FLOWING ONLY TURBIDITY: None Slight Cloudiness Cloudy Opaque ONLY FLOATABLES: None Stewage (toilet paper, etc.) Petroleum (oil sheen) Other: OTHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Sedimentation Other: OTHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Sedimentation CONCERNS: Needs Regular Maintenance Bank Erosion Other: POTENTIAL RESTORATION CANDIDATE Discharge investigation Stream daylighting Local stream repair/outfall stabilization In no Storm water retrofit Other: Other: If yes for daylighting: transform outfall: ft Type of existing vegetation: Knot Wild Slope: 45 o If yes for stormwater: Is stormwater currently controlled? Land Use description: for stord and to dorless. If the discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge papers to be having a significant impact downstream. Small discharge; flow mostly clear and odorless. If the discharge is very small compared to the stream's base flow and any impact appears to be minor / localized. Outfall does not have dry weather discharge is very small compa	 None √Chip/Cracked Peeling Paint Corrosion 	☐Gas ☐ Sewage ☐Rancid/Sour ☐ Sulfide	□ None □Oily □ Flow Line □ Paint	None Brown Normal Other: Inhibited POOL QUALIT Excessive Good Other: Suds All	Orange □ Green Y: ☑/No pool lors □Colors □Oils
□ no □ Storm water retrofit □ Other: If yes for daylighting:	FLOWING ONLY TURBID FLOATA OTHER Excel	ITY: None BLES: None Strash (paper/pla	e 🗌 Slight Cloudines e 🔲 Sewage (toilet pa astic bags) 🗌 Dur	Cloudy Opaque er, etc.) Petroleum (oil sheen) ping (bulk) Excessive Sedimentation	
If yes for stormwater: Is stormwater currently controlled? Land Use description: Forefaced to yes identical Yes No Not investigated Area available: OUTFALL Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream. Small discharge; flow mostly clear and odorless. If the discharge; staining; or appearance of causing any erosion problems. 0 1 5 4 3 2 1	no If yes for daylighting:		Storm water retro	Other:	
SEVERITY: strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream. Small discharge; now mostly clear and odorless. If the discharge is a color and/or odor, the amount of discharge; staining; or appearance of causing any erosion problems. Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems. Sevenity: 5 4 (3) 2 1	Is stormwater currently co		Land U	description: Forested to resident	A A A A A A A A A A A A A A A A A A A
	SEVERITY: com (circle #) stro	ng smell. The amount o pared to the amount of am; discharge appears ificant impact downstrea	f discharge is significant normal flow in receiving to be having a am.	charge has a color and/or odor, the amount of charge is very small compared to the stream's base v and any impact appears to be minor / localized.	narge; staining; or appearance
	SKETCH/NOTES:	3	4	3) 2	l
Reported to authorities: Yes No				REPORTED TO AUT	HORITIES: 🗌 YES 🔲 NO

Reach Level Assessment



SURVEY REACH	D: CBOS WTRSHD/S	ubshd: ()()	irles Brook	DATE: 7 / 10		sed by: rilnds
START TIM	E::AM/PM L	MK:	END TIME:	:AM/PM	LMK:	GPS ID:
LAT''	" Long°	1 11	LAT'	'' Long	o †	11
DESCRIPTION: U	nderground		DESCRIPTION:	Lawn 2.		
	Anna and An					
RAIN IN LAST 24 HO	•	teady rain	PRESENT CONDITIONS	-	□ Steady rain	□ Intermittent
□ None	□ Intermittent □ T					□ Partly cloudy
SURROUNDING LAN	DUSE: Golf course	Commercial Park	□ Urban/Residential □ Crop	□ Suburban/Res □ Pasture	□ Forested □ Other:	□ Institutional
AVERAGE	CONDITIONS (check applied	cable)	REACH	SKETCH AND SIT	TE IMPACT TRA	ACKING
BASE FLOW AS % CHANNEL WIDTH		0%-75% 75-100%	within the survey r	of survey reach. Tra each (OT, ER, IB,SC, deemed appropriate.	UT, TR, MI) as well	ll as any additional
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5)	slick)	>10")				
	□ Clear □Turbid (susper aturally colored) □ Opaqu dyes)					
AQUATIC PLANTS IN STREAM	Attached: \Box none \Box so Floating: \Box none \Box so					
Wildlife in or Around Stream	(Evidence of)	Deer	-		مېرىنى يېرىكى يې يېرىكى يې يېرىكى يې يېرىكى يې	مر المراجع الم
STREAM SHADING (water surface)	 ☐ Mostly shaded (≥75% d ☐ Halfway (≥50%) ☐ Partially shaded (≥25%) ☐ Unshaded (< 25%) 	- /			na da se an	and and a set of the s
CHANNEL	Downcutting	Bed scour	The second	Appression		
DYNAMICS		Bank failure	The form the second second			
		Bank scour Slope failure	14 To 2 To	-\$.s		
Unknown		Channelized	are entry which and	ohr	aqmites	
CHANNEL	Height: LT bank	(ft)		Q	seep /	
DIMENSIONS (FACING	RT bank	(ft)	6	ر		
DOWNSTREAM)	Width: Bottom	(ft)	1 M		Lim	Frain
	Top	(ft)		7	STU	amound
	LEACH ACCESSIBILITY Fair: Forested or Difficult	t. Must cross		が気目		thes amound i
Good: Open area in public ownership,	developed area wetland	, steep slope, or	NU	2 2	Juragm	Y WITTE
sufficient room to		e areas to get to Few areas to		a si	+ X mari	£/ .
stockpile materials,		e available		5 1		
easy stream channel access for heavy		ocated a great	I I	· 12 1		_
equipment using		e from stream. zed heavy		Reck	ledye	~
existing roads or trails.	stream. equipme	ent required.		A management		
	4 <u>3</u> 2 blem you see in survey reach)	I	1	- / m		
1				WUG-V		
Str.	eam is entir	ely une	durground			
Super	ior propane	Mons bu	aon truin t	REPOR	TED TO AUTHORI	TIES YES NO
divert	. Previous ourse	vis said	to have paise	d'land at	least 4'	

	Optimal	Suboptimal	Marginal	Poor
HABITATfavorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snagss		40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.
-	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
Floodplain Connection	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	<u>20 19 18 17 16</u>	<u> </u>	10 9 8 7 6	5 4 3 2 1 0
<u></u>		ALL BUFFER AND FLOODPLA		
	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function
l	20 19 18 17 16	15 14 13 12 11		

Reach Level Assessment RCH

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SURVEY REACH I	D: <u>GBST-</u> OI WI	rrshd/Subshd: Ga	es Sauch Taily	DATE: <u>615</u>	Asse	ESSED BY:
	e: <u>11 : /77</u> AM/PN		END TIME://	: <u>40</u> AM/PM	LMK:	GPS ID:
LAT <u>41 ° 51 '</u>	<u>15,9</u> " Long_	720 25 131.2"	LAT41 º 51 ' 1	<u>6.6</u> " Long 72	<u>° 25 10</u>	1.3 "
DESCRIPTION:		~ 1	DESCRIPTION:			
L		· · · · · · · · · · · · · · · · · · ·				
RAIN IN LAST 24 HO	urs 🗆 Heavy rain	□ Steady rain	PRESENT CONDITIONS	□ Heavy rain	□ Steady rair	1 🗆 Intermittent
□ None	Q [∕] Intermittent	t 🗆 Trace	□ Clear	□ Trace	Overcast	Partly cloudy
SURROUNDING LAN		al 🗆 Commercial urse 🗆 Park	□ Urban/Residential □ □ Crop □	□ Suburban/Res □ Pasture	Forested Other:	□ Institutional
AVERAGE	CONDITIONS (che	eck applicable)	REACH S	KETCH AND SIT	TE IMPACT TH	RACKING
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	⊠ 50%-75% □ 75-100%	Simple planar sketch oj within the survey read features d		UT, TR, MI) as w	ell as any additional
DOMINANT SUBSTR □ Silt/clay (fine or □ Sand (gritty) ☑ Gravel (0.1-2.5	slick) C	obble (2.5 –10") oulder (>10") ed rock		А 6 В3Т-03		2-1 R
WATER CLARITY	aturally colored) \Box		State - 2	-endd ro		Eroszan *
AQUATIC PLANTS IN STREAM		ne □ some □ lots e □ some □ lots		-end GES	F-01	- Willen tree t
WILDLIFE IN OR AROUND STREAM	(Eyidence of) ☑ Fish □ Beav □ Snails □ Othe		Old stone T	52° P		original albeg
STREAM SHADING (water surface)	 ☑ Mostly shaded □ Halfway (≥50% □ Partially shaded □ Unshaded (< 25 	%) d (≥25%)			and the first first state	k
CHANNEL	Downcutting	Bed scour	$ /\langle \rangle$			Erosion
DYNAMICS	Widening	Bank failure				L'Erosiant
Unknown	Headcutting Aggrading Sed. deposition	Bank scour Slope failure Channelized				1
CHANNEL	Height: LT bank	<u> </u>		V.		
DIMENSIONS	RT bank	(ft)	- 1/5	1		
(Facing downstreaM)	Width: Bottom	(ft)	p P			
DOWNSTREAM)	Тор	12 (ft)				
R	EACH ACCESSIBILI			1 1		
Good: Open area in	Fair: Forested or	Difficult. Must cross	/	· /		
public ownership,	developed area adjacent to stream.	wetland, steep slope, or sensitive areas to get to		1		
sufficient room to stockpile materials,	Access requires tree	stream. Few areas to	. / 10	at DI		
easy stream channel	removal or impact to landscaped areas.	stockpile available and/or located a great	GD-01 615	51-01		
access for heavy equipment using	Stockpile areas	distance from stream.		1.		
existing roads or trails.	small or distant from stream.	Specialized heavy _equipment required.				
5 4		2 1		>		
NOTES: (biggest prob	lem you see in survey	reach)				
)						
				REPOR	TED TO AUTHOR	RITIES 🗌 YES 🗌 NO

	Optimal	Suboptimal	Marginal	Poor
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall_and- <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
nubliul regime)	20 19 /18 /17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 (79)	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	the second of the second s	ALL BUFFER AND FLOODPLAI		5 4 3 2 1 0
<u>~</u>	Optimal	Suboptimal	Marginal	Poor
VEGETATED BUFFER WIDTH	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.
	Left Bank (10) 9 Right Bank 10 9	<u> </u>	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	8 7 6 Predominant floodplain vegetation type is young forest	5 4 3 Predominant floodplain vegetation type is shrub or old field	2 1 0 Predominant floodplain vegetation type is turf or crop land
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function
	20 19 / 18)17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Reach Level Assessment RCH

SURVEY REACH I	D: GBSFOR WTRSHD/SUBSHD: Gase	, BKS Trib	Date: <u>6</u> 1 <u>5</u>	ASSESSED BY:	
	E: <u>//</u> : <u>50</u> AM/PM LMK:	,	2:45 AM/PM	LMK:	GPS ID:
Lat <u>41°51 '</u>	166" LONG 25 1043"	LAT <u>4/ ° 51 ' 17</u>	<u>7.0 </u> " Long 7 <u>/</u>	<u>2°24 '393"</u>	
DESCRIPTION:		DESCRIPTION:			
		·····			
RAIN IN LAST 24 HO		PRESENT CONDITIONS	□ Heavy rain	□ Steady rain □ Inter	
□ None	Vintermittent			A	ly cloudy
SURROUNDING LAN	DUSE: Industrial Commercial Golf course Park	□ Urban/Residential □ □ Crop □	□ Suburban/Res □ Pasture	□ Forested □ Instit □ Other: Highwar	
Average	CONDITIONS (check applicable)	1		E IMPACT TRACKING	1
BASE FLOW AS %	□ 0-25%	Simple planar sketch og	f survey reach. Trac	ck locations and IDs for all	site impacts
CHANNEL WIDTH	□25-50 % □ 75-100%	within the survey read	ch (OT, ER, IB,SC, leemed appropr iate	UT, TR, MI) as well as any Indicate direction of flow	additional
DOMINANT SUBSTR □ Silt/clay (fine or □ Sand (gritty) ☑ Gravel (0.1-2.5	slick) ⊡ Cobble (2.5 –10") ⊡ Boulder (>10")		ハイマムシ	JSC-1 CM-1	
	Clear DTurbid (suspended matter) aturally colored) Dopaque (milky) dyes)	fonce	- for-	2	
AQUATIC PLANTS	Attached: \square none \square some \square lots		1 75.40	"Envell	
IN STREAM	Floating: I none I some I lots			1 5 think	
WILDLIFE IN OR AROUND STREAM	(Eyidence of) ☑ Fish □ Beaver ☑ Deer □ Snails □ Other: <u>Sna ke</u>			d	
STREAM SHADING (water surface)	 Mostly shaded (≥75% coverage) □ Halfway (≥50%) □ Partially shaded (≥25%) □ Unshaded (< 25%) 		de la compañía		
CHANNEL	Downcutting Bed scour		BEDS1011		
DYNAMICS	Widening Bank failure		A contraction of the second seco		
Unknown	Headcutting Bank scour Aggrading Slope failure Sed. deposition Channelized	and the second	(Erosian)		
CHANNEL	Height: LT bank(ft)		anincost		
DIMENSIONS	RT bank(ft)		ét '	\vee	
(Facing downstreaM)	Width: Bottom(ft)	denmed -	-	prove the second s	
	Top <u>12.5</u> (ft)	Arec 1	16	· D	
R	REACH ACCESSIBILITY		14/	07_ 1	
Good: Open area in	Fair: Forested or Difficult. Must cross developed area wetland, steep slope, or	Non-realize on of	Give	nd weder threadory	
public ownership, sufficient room to	adjacent to stream. sensitive areas to get to	4	1 Steps	t tributory.	
stockpile materials,	Access requires tree stream. Few areas to removal or impact to stockpile available	10/10/10/10/10/10/10/10/10/10/10/10/10/1	And the control of the second	0	
easy stream channel access for heavy	landscaped areas. and/or located a great	/			
equipment using	Stockpile areas distance from stream. small or distant from Specialized heavy	S & S			
existing roads or trails.	stream. equipment required.	- X) 3	\$ Č.		
	4 3 (2) 1 olem you see in survey reach)	I			
)					
	an essent		REPORT	TED TO AUTHORITIES	Yes 🗌 No

	Optimal	Suboptimal	Marginal	Poor
N-STREAM HABITAT (May modify	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable babitat and at stage to allow full	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently	Less than 20% stable habitat; lac of habitat is obvious; substrate
criteria based on appropriate habitat regime)	stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	disturbed or removed.	unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambanl surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetatio has been removed to 5 centimeters or less in average stubble height.
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	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	Over	ALL BUFFER AND FLOODPLA	IN CONDITION	
	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.
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	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
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	20 19 18 17 16	15 14 1/3 12 11		

			Sto	orm Water Outfalls	OT	
WATERSHED/SUBS	HED: Gater	Dowich strib	DATE: 6/5/0	Assessed by: 🕇	>ZFS	
SURVEY REACH II	: 03st.02	ГІМЕ: <u>12: 30</u> ам/рм	Рното ID: (Camera-l		334	
SITE ID (Condition-#): OT- <u>ØZ</u>	LAT 4	"LONG 72 . 24 . 47.3		PS: (Unit ID)	
BANK: LT RT Hea FLOW: None Trick Moderate	Closed	MATERIAL: Concrete M PVC/Plastic B Other:		e) d	SUBMERGED:	
Substantial	Open channel	Concrete Ear		Depth:(in) Width (Top):(in) " (Bottom):(in)	NOT APPENCABLE	
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: X NO Gas Sewage Rancid/Sou Sulfide Other:	□ None □Oily	VEGGIE DENSITY: None Normal Inhibited Excessive Other:	PIPE BENTHIC GROW Brown Orange Other: POOL QUALITY: Good Odors Suds Algae Other:	Green No pool Colors Oils	
OTHER III CONCERNS: III POTENTIAL RESTO In no If yes for daylightim	Excess Trash (paper/j Needs Regular Maint PRATION CANDIDA	TE Z Discharge invest	nping (bulk)	e Sedimentation , .S. etasin n. Inc	le	
Length of vegetative cover from outfall: ft Type of existing vegetation: Slope: \circ If yes for stormwater: Is stormwater currently controlled? Land Use description: $Area available:$ $Area available:$						
OUTFALL ' SEVERITY: (circle #)	Heavy discharge with a c strong smell. The amount compared to the amount stream; discharge appea significant impact downst	t of discharge is significant of normal flow in receiving rs to be having a fream.	Small discharge; flow mostly clear and discharge has a color and/or odor, the a lischarge is very small compared to the low and any impact appears to be mino	amount of e stream's base or / localized.	t have dry weather ning; or appearance erosion problems.	
SKETCH/NOTES:	Sel embor	ot or w/ m	y weather filtered	2	1	
)		> GBST-	ulenneg (#HYSIAB MSGT OKEN, urv. ,	REPORTED TO AUTHORITIE	S: 🗌 YES 🗌 NO	

Other: Other: Other: Stads Algac Floatables FOR COLOR: Image: Color i				Stor	rm Water Outfalls	ΟΤ		
STEE ID (Contation-di: OT_O	WATERSHED/SUBS	HED: Games BI	LS. Trib	DATE: 615109	Assessed by:			
STIELD Conductor.#): OT-OZ LAT <u>LL</u> ° <u>AL</u> <u>170</u> "LONG <u>Z2°24</u> <u>1346</u> " LMK	SURVEY REACH II	GBST-02 7	ГIME: <u>12:35</u> АМ/РМ	Рното ID: (Camera-Pi	c#)/anon 1#	18.35		
Image: Second	SITE ID (Condition-#): O T- <u>^3</u> I	LAT 4/ 0 61317.0 " L					
Substantial Open Concrete Earnehen Irrepczołd Deph:: (m) Other: Other: Other: Width (Top): (in) NOT represente CONDITION: Obore: Other: Width (Top): (in) NOT represente CONDITION: Obore: Obore: Width (Top): (in) NOT represente Control: Sewage Provide and the paratolic None Brown Orange Creation Control: Sewage Point Inhibited Pool QUALITY: None Control: Other: Other: Pool Quality: Pool Quality: Pool Quality: Control: Other: Other: Other: Pool Quality: Pool Quali	LT RT Hea FLOW: None Tric	d Closed	☑ Concrete □Metal □ PVC/Plastic □□Brick	Circular Double		✓No Partially		
Image: Chip/Cracked Gas Image: Chip/Cracked Brown Orange: Chip/Cracked Pecling Paint Rencid/Sour Flow Line Inhibited Other: Orange: Chip/Cracked Other: Gas Gas Flow Line Inhibited Pool. QUALITY: Mono Other: Other: Gas Gas Flow Line Inhibited Pool. QUALITY: Mono Gas Other: Other: Other: Other: Other: Other: Other: Good Other: PlowInc Tuttammry: Mono Stight Cloudiness Cloudy Opaque Other: ONLY Tuttammry: Mono Stight Cloudiness Cloudy Opaque Other: ONLY Tuttammry: Mono Stight Cloudiness Cloudy Opaque Other: ONLY Tuttammry: Mono Stowage (tolet paper, etc.) Petroleum (oil sheen) Other: ONHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Sedimentation Concernse: Norm water retrofit Other: Other: Yestor daylighting: Land Use desc	Substantial	· ·		Parabolic W	/idth (Top):(in)	NOT APPEICABLE		
Corresion Suifide Path Other: Other: Other: Excessive Good Cotors Other: FOR COKOR: Clear Brown Grey Yellow Green Orange Red Other: PLOWING TRINDITY: Phone Slight Cloudiness Cloudy Opaque Other: Other: ONL: Triostrables Excessive Other: Petroleum (oil sheen) Other: OTHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Scdimentation CONCERNS: Needs Regular Maintenance Bank Erosion Other: Other: POTENTIAL RESTORATION CANDIDATE Discharge investigation Stream daylighting Local stream repair/outfall stabilization no Storm water retrofit Other: Slope:	None Chip/Cracked	☐Gas ☐ Sewage ☐Rancid/Sou	☐ None ☐ Oily r ☐ Flow Line	☐ None ☑ Normal	Brown Orang	e 🖵 Green		
FLOWING ONLY TURBIDITY: Image: Sight Cloudiness Cloudy Opsque ONLY FLOATABLES: Mone Sewage (toilet paper, etc.) Petroleum (oil sheen) Other: OTHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Sedimentation Other: CONCERNS: Needs Regular Maintenance Bank Erosion Other: Other: POTENTIAL RESTORATION CANDIDATE Discharge investigation Stream daylighting Local stream repair/outfall stabilization no Storm water retrofit Other: Slope:					Good Odors Suds Algae	Colors Oils		
Image: Incost of the amount of discharge is significant impact downstream. Storm water retrofit Other: If yes for daylighting:	FLOWING TUR ONLY FLC OTHER	FLOWING ONLY TURBIDITY: None Slight Cloudiness Cloudy Opaque ONLY FLOATABLES: None Sewage (toilet paper, etc.) Petroleum (oil sheen) Other: OTHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Sedimentation						
Length of vegetative cover from outfall:ft Type of existing vegetation:Slope: Slope: If yes for stormwater: Is stormwater currently controlled? Land Use description: Yes No No investigated Area available: OUTFALL Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant impact downstream. Small discharge; flow mostly clear and odorless. If the discharge is very small compared to the stream's base flow and any impact appears to be minor / localized. Outfall does not have dry weather discharge; is very small compared to the stream's base flow and any impact appears to be minor / localized. Outfall does not have dry weather discharge; is very small compared to the stream's base flow and any impact appears to be minor / localized. Outfall does not have dry weather discharge; is very small compared to the stream's base flow and any impact appears to be minor / localized. Outfall does not have dry weather discharge; is very small compared to the stream's base flow and any impact appears to be minor / localized. Outfall does not have dry weather discharge; is very small compared to the stream's base flow and any impact appears to be minor / localized. Outfall does not have dry weather discharge; is very small compared to the stream's base flow and any impact appears to be minor / localized. Outfall does not have dry weather discharge; is very small compared to the stream's base flow and any impact appears to be minor / localized. SkettCH/NOTES: Impact flow flow flow flow flow flow flow flow	🔲 no				Local stream repair/o	utfall stabilization		
Is stormwater currently controlled? Land Use description: Yes Not investigated Area available: OUTFALL SEVERITY: (circle #) Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream. Small discharge; flow mostly clear and odorless. If the discharge; staining; or appearance flow and any impact appears to be minor / localized. Outfall does not have dry weather discharge; staining; or appearance for auang any erosion problems. SKETCH/NOTES: Stere true 5 4 3 2 1	· -	-	ft Type of exist	ting vegetation:	Slope:	0		
SEVERITY: (circle #) strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream. Striat discharge; flow mostly clear and odoriess. If the discharge has a color and/or odor, the amount of discharge is very small compared to the stream's base flow and any impact appears to be minor / localized. Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems. 5 4 3 2 1	Is stormwater current	ly controlled? Not investigated	Area availabl					
Ptires	SEVERITY:	strong smell. The amount compared to the amount stream; discharge appea significant impact downst	t of discharge is significant of normal flow in receiving rs to be having a flow an	ge has a color and/or odor, the am ge is very small compared to the s d any impact appears to be minor /	tream's base / localized.	aining; or appearance ny erosion problems.		
Plands DE								
REPORTED TO AUTHORITIES: YES NO)	Plass	or a	R	EPORTED TO AUTHODIT			

					Channe	Modificatio	n	CM
WATERSHED/SUBSHED:	Gazes Bks	. Trib	·	DATE	: 61 5-	-108	ASSESSEI	DBY: JHW
SURVEY REACH ID: G	35T-02	TIME: <u>12</u> :	40 AM/PM	·		(Camera-Pic #)		835
SITE ID: (Condition-#)	START LAT 1 °	<u>SI 177.1</u> "	LONG 72	o 24 I	1493"	LMK 8" 2		: (Unit ID)
CM	END LAT 41 °	51120"	LONG 72	<u>• 2 1/ 1</u>	39.8 "	LMKISY	الله الم الم	
			·····					

TYPE: Channelization	Bank armoring concrete channel	loodplain encroach	ment 🗌 Other:	
MATERIAL:	Does channel have perennial flow?	🕅 Yes 🗌 No	DIMENSIONS:	
Concrete Gabion	Is there evidence of sediment deposition?	Yes 🗌 No	Height Bottom Width	<u>(ft)</u> 5 (ft)
	Is vegetation growing in channel?	Yes 🗌 No	Top Width:	(ft)
Other:	Is channel connected to floodplain?	🗌 Yes 📈 No	Length:	See GPS coord (ft)

% of channel	[ADJACENT STREAM Available width Utilities Present?		_(ft) RT <u>/00+</u> (ft) Fill in floodplain? □Yes ⊠ No
	ESTORATION CANDIDATE	tructural repair 🛛 🗌 Bas	e flow channel creation	n 🔲 Natural char	nnel design 🔲 Can't tell
l no		De-channelization 🗌 Fisl	h barrier removal	🕅 Bioengineer	ing
CHANNEL- IZATION SEVERITY: (Circle #)	A long section of concrete stream (>500') channel where water is very shallow (<1" deep) with no natural sediments present in the channel.	A moderate length (> 200') ,t beginning to function as a na Vegetated bars may have for	itural stream channel.	depth, a natural sec	I less than 100 ft with good water diment bottom, and size and e unchannelized stream reaches npacted area.
L	5	4 (3)		2	1
Notes:	J-84 Ves	upland (Forest)		al De Dragger-Journey Statistic general anna maidracha annan aintean annan general general anna Thair an anna maidracha	manufanation 811 RCP

				Storm Water Outfalls	ΟΤ
WATERSHED/SUBS	HED: G-BS	1-02	DATE:/_	5 108 Assessed by:	NPR
SURVEY REACH ID	•	TIME: 12: 10 AM/		Camera-Pic #) /#	829
SITE ID (Condition-#)	: OT- <u>01</u>	LAT 200 7	FT . DONG - OF S	EEP (SEE PHOTO LMK_	GPS: (Unit ID)
		Sageri Ma	ONFLUENCE)		
BANK: LT RT Hea FLOW: None Trick	Closed	MATERIAL: Concrete PVC/Plastic Other:	🛛 Metal 🛛 Circular	☐ Single DIMENSIONS: ☑ Double ☐ Triple Diameter: <u>└८ (in</u>	SUBMERGED:
Moderate Substantial Other:	Dpen channel	Concrete D	Parabolic Other:	Depth: <u>(in)</u> Width (Top): <u>(in)</u> " (Bottom): <u>(in)</u>	NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: The second	□ None ⊠Oily	NS: VEGGIE DEN None Normal Inhibited		ge 🗌 Green
Corrosion	Sulfide	☐ Paint ☐Other:	Excessive Other:	-	Colors Oils
ONLY FLO. OTHER E	BIDITY:	None 🔄 Slight Cloudi None 🔄 Sewage (toile r/plastic bags) 🗌	Iness Cloudy et paper, etc.) Image: Cloudy Dumping (bulk) Image: Cloudy	Opaque)ther:)ther:
🔲 no		ATE Discharge inv		lighting 🕅 Local stream repair	outfall stabilization
<i>If yes for daylighting</i> Length of vegetative c	-	ft Typ	e of existing vegetation:_	Slope:	0
If yes for stormwater Is stormwater currently Yes X No No	r: y controlled? lot investigated		d Use description: <u>H((</u> a available:	5HWAY (84	
SEVERITY: (circle #)	strong smell. The amo	nstream.	Small discharge; flow most discharge has a color and/o discharge is very small com flow and any impact appear	r odor, the amount of pared to the stream's base s to be minor / localized.	s not have dry weather staining; or appearance any erosion problems.
SKETCH/Norma		5	4 (3)	2	1
SKETCH/NOTES:	WEILAA	SETT CUAREL	LU ELOTED V	RT 84	
J			· · · · · · · · · · · · · · · · · · ·	REPORTED TO AUTHORI	TIES. I YES INO

3

Stream Crossing WATERSHED/SUBSHED: Gears Rh DATE: \int / S ASSESSED BY: 110 102 URVEY REACH ID: 6-35T - 02 TIME: 12 : 40 AM/PM PHOTO ID: (Camera-Pic #) LAT 41°51 127.0" LONG 7 024 191.8" SITE ID: (Condition-#) SC- 021 LMK GPS (Unit ID) TYPE: 🕅 Road Crossing 🔲 Railroad Crossing 🔲 Manmade Dam 📋 Beaver Dam 🗔 Geological Formation 🔲 Other: **#BARRELS: DIMENSIONS:** (*if variable, sketch*) SHAPE: **MATERIAL:** ALIGNMENT: Arch Bottomless Single X Concrete Flow-aligned Barrel diameter: English and a second __(ft) 🗌 Box Double Elliptical Metal Not flow-aligned Height: (ft)FOR ROAD/ X Circular Triple Other: 🗌 Do not know RAILROAD Other: Other: CROSSINGS Culvert length: (ft) **CONDITION:** (Evidence of...) **CULVERT SLOPE: O**NLY 🔽 Flat Width: (ft)Cracking/chipping/corrosion Downstream scour hole \Box Slight (2° – 5°) Sediment deposition Failing embankment \Box Obvious (>5°) Roadway elevation: descripty wood (ft) Other (*describe*): POTENTIAL RESTORATION CANDIDATE Fish barrier removal Culvert repair/replacement Upstream storage retrofit 🖾 no Local stream repair Other: IS SC ACTING AS GRADE CONTROL No ☐ Yes Unknown **BLOCKAGE SEVERITY:** (circle #) **EXTENT OF PHYSICAL BLOCKAGE:** 🗌 Total Partial A structure such as a dam or A total fish blockage on a A temporary barrier such as a Temporary Unknown road culvert on a 3rd order or tributary that would isolate a beaver dam or a blockage at If yes for greater stream blocking the significant reach of stream, the very head of a stream with CAUSE: fish barrier upstream movement of or partial blockage that may very little viable fish habitat Drop too high Water Drop: _____ (in) anadromous fish; no fish interfere with the migration of above it; natural barriers such passage device present. anadromous fish. as waterfalls. Flow too shallow Water Depth: _____ (in) Other: 5 4 3 **NOTES/SKETCH:** NETTERA 07-03 **REPORTED TO AUTHORITIES** YES NO

			. 8		
			RE	ach Level Assessment	RCH
SURVEY REACH	D: GBST-03 WTRSI	HD/SUBSHD:	ges Brook	DATE: 615 108 ASS	ESSED BY:
<u>/////////////////////////////////////</u>	IE: 11:39 AM/PM	LMK:	END TIME:		DRB GPS ID:
	16.6" LONG 72°		LAT 410 51 11	<u>1.4"</u> LONG <u>12° 25 '04</u>	
DESCRIPTION:	mf. of (+135Tc)	01 02 803	DESCRIPTION:	(-n)	
RAIN IN LAST 24 HO		☐ Steady rain			
□ None			PRESENT CONDITIONS	□ Heavy rain □ Steady rain □ Trace □ Overcast	n □ Intermittent ▶ Partly cloudy
SURROUNDING LAN	DUSE: Industrial Golf course	□ Commercial □ Park		□ Suburban/Res ☐ Forested □ Pasture □ Other:	□ Institutional
	CONDITIONS (check a		A CONTRACTOR AND A CONTRACTOR OF THE DESIGNATION	KETCH AND SITE IMPACT T	
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	□ 50%-75% ☑ 75-100%	within the survey read	f survey reach. Track locations and ch (OT, ER, IB,SC, UT, TR, MI) as v eemed appropriate. Indicate directi	vell as any additional
DOMINANT SUBSTR	1.	le (2.5 –10")		ς Ι	\$ aray
Sand (gritty)	🗹 Bould	ler (>10")	rectricite		
□ Gravel (0.1-2.5	,		3)4(0)yyerrollogia		FMSANULIEI
	Clear Durbid (su. aturally colored) Dop		Barlot RS	1 St. 1	
\Box Other (chemicals,		aque (milky)		-163871	
AQUATIC PLANTS	Attached: Mone] some □ lots		* ABONIL	Concessor Concessor
IN STREAM	Floating: 🕅 none 🗆] some 🛛 lots	An result (and performance in the result of a second second second second second second second second second s	10- 3/11	
WILDLIFE IN OR AROUND STREAM	(Evidence of) □ Fish □ Beaver	□ Deer			Kap
AROUND STREAM	□ Snails □ Other:			ISLAMP KALT JI	TOWNSMITTON
STREAM SHADING	Mostly shaded (≥75 □ Halfway (≥50%)	5% coverage)			
(water surface)	□ Partially shaded (≥2 □ Unshaded (< 25%)	25%)	· · · · · ·		
2		Bed scour			
CHANNEL DYNAMICS	Widening	Bank failure	6	Bin	wany
NONA	Headcutting	Bank scour	WWOODED	s the	ODED
Unknown	Aggrading Sed. deposition	Slope failure Channelized			
0	Height: LT bank	2.5 (ft)			
CHANNEL DIMENSIONS	RT bank	$\frac{2\cdot 5}{1\cdot 5}$ (ft)			
(Facing downstreaM)	Width: Bottom	<u>/2</u> (ft)			
	Top _	(ft)			
1	EACH ACCESSIBILITY	ficult. Must cross		Secure and a secure	
Good: Open area in public ownership,	developed area wet	tland, steep slope, or			
sufficient room to stockpile materials,	Access requires tree stre	isitive areas to get to eam. Few areas to		almonetation and a service of the se	9900 ###101 + 0000 100 000 000 000 000 000 000 0
easy stream channel		ckpile available I/or located a great	M) 6851.02	AB 9	st-01 ~s
access for heavy equipment using	Stockpile areas dist	tance from stream. ecialized heavy			
existing roads or trails.	stream. equ	ipment required.			
5 4 Notes: (biggest prob	l 3 2 lem you see in survey reac	h	<u> </u>		
1	WERTHEAKIN (
~ ~ ~	e de como de	- 1. 4 - J			
				REPORTED TO AUTHOR	RITIES 🗌 YES 🗌 NO

	Optimal	Suboptimal	Marginal	Poor
IN-STREAM HABITAT	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of	20-40% mix of stable habitat; habitat availability less than	Less than 20% stable habitat; lac
(May modify criteria based on appropriate	stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and not transient).	populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may	desirable; substrate frequently disturbed or removed.	of habitat is obvious; substrate unstable or lacking.
habitat regime)	20 19 18 17 16	rate at high end of scale).	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambanl surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetatio has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
·····	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	20 19 18 17 16	<u>15 14 13 (12) 11</u>	10 9 8 7 6	5 4 3 2 1 0
		ALL BUFFER AND FLOODPLA		
	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: littl or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land
	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	No evidence of floodplain	Minor floodplain encroachment in the form of fill material, land	Moderate floodplain encroachment in the form of filling, land development, or	Significant floodplain encroachment (i.e. fill material, land development, or man-made
Floodplain Encroach- ment	encroachment in the form of fill material, land development, or manmade structures	development, or manmade structures, but not effecting floodplain function	manmade structures, some effect on floodplain function	structures). Significant effect on floodplain function

FOR ROAD/ RAILROAD \square Box Circular \square Elliptical \square Triple \square Other: \square Metal \square Other: \square Not flow-aligned \square Do not knowHeight: \square (ft)CROSSINGSCONDITION: (Evidence of)Culvert slope:Culvert length: \square Culvert length:			A			Stre	am Cros	ssing	SC
JURVEY REACH ID: Image: Solution and the second	WATERSHED	SUBSHED: Doyes Son	th-trile		DATE:	515102	ASSE	SSED BY	DEB
STTE ID: (Condition-#) SC-01 LAT LAT LONG T2° 25 LMK GPS (Unit ID) TYPE: Road Crossing Railroad Crossing Manmade Dam Beaver Dam Geological Formation Other: TYPE: Road Crossing Railroad Crossing Manmade Dam Beaver Dam Geological Formation Other: Arch Bottomless # BaRRELS: MATERIAL: ALGONMENT: DIMENSIONS: (if variable, sketch) Barrel diameter: 4.(f) Single Concrete Do not know Height: (f) RALROAD Other: Other: Do not know Culvert stops: Culvert length: 250°(fi) ONLY Crossing Geological formation Culvert length: 250°(fi) Width: (f) Crossing Contert: Downstream scour hole Slight (2° - 5°) Slight (2° - 5°) Roadway elevation: 250°(fi) Contert (describe): TAF Fish barrier removal Culvert repair/replacement Upstream storage retrofit Ø_no Local stream repair Other: Stodiare stora blocking the as adam or or add culvert negair/replacement of as adam or or add culvert	<u>}</u>		TIME: 1:50	Dam/pm					
TYPE: Road Crossing Railroad Crossing Manmade Dam Beaver Dam Geological Formation Other: FOR ROAD/ RAILROAD Arch Bottomless # BARRELS: MATERIAL: ALIGNMENT: DIMENSIONS: (if variable, sketch) Box Elliptical Model Onerete Flow-aligned Barrel diameter: 4(ft) RAILROAD Circular Triple Other: Other: Do not know CROSSINGS CONDITION: (Evidence of) Other: Other: CULVERT SLOPE: Width: (ft) Scaliment deposition Failing embankment Slight (2° - 5°) Obvious (>5°) Roadway elevation: Culvert length: 2 (ft) POTENTIAL RESTORATION CANDIDATE Fish barrier removal Culvert repair/replacement Upstream storage retrofit M_no Ves Unknown Yes Unknown A total fish blockage on a tribulary blockage	SITE ID: (Con	n a she an	4051.17	" LONG					· · · · · · ·
For ROAD/ RAILROAD CROSSINGS ONLY SHAPE: Arch Bottomless Box Elliptical # BARRELS: Single Double Triple MATERIAL: Concrete Double Triple ALIGNMENT: Single Double Triple DIMENSIONS: (if variable, sketch) Barrel diameter: Don to know CROSSINGS ONLY Other: Double Cracking/chipping/corrosion Sediment deposition Mother: Triple Downstream scour hole Sediment deposition Mother: CULVERT SLOPE: Blat Slight (2° - 5°) Sobvious (>5°) DIMENSIONS: (if variable, sketch) Barrel diameter: (ft) Uevert length: Volvert length: Volver								- 1	
For RoAD/ RAILROAD Arch Bottomless Single Concrete Flow-aligned Barrel diameter: 4(ft) RAILROAD Circular Other: Other: Do not know Culvert slope: Barrel diameter: 4(ft) CROSSINGS ONDITION: (Evidence of) Condition (Evidence of) Culvert slope: Culvert length: Culvert length: Culvert length: Culvert length: Vidth: (ft) ONLY Cracking/chipping/corrosion Downstream scour hole Slight (2° - 5°) Roadway elevation: Sodway elevation:	TYPE: 🛛 Roa	ad Crossing 🔲 Railroad Crossi	ng 🗌 Manmade	Dam 🗌 Beav	er Dam] Geological For	mation	Other:	
ONLY Condition. (<i>chalence of m.</i>) Width: (<i>chalence of m.</i>) Cracking/chipping/corrosion Downstream scour hole Flat Slight (2° - 5°) Sediment deposition Failing embankment Slight (2° - 5°) Roadway elevation: (ft) POTENTIAL RESTORATION CANDIDATE Fish barrier removal Culvert repair/replacement Upstream storage retrofit Model Local stream repair Other: Other: A total fish blockage on a tributy that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish; no fish passage device present. A total fish blockage that may interfere with the migration of anadromous fish. A total fish blockage that may interfere with the migration of anadromous fish.	RAILROAD	☐ Arch ☐Bottomless ☐ Box ☐ Elliptical ☑ Circular ☐ Other:	Single	Concrete		ow-aligned ot flow-aligned o not know	Barrel dia	ameter: Height:	(ft)
Other (describe): Find POTENTIAL RESTORATION CANDIDATE Fish barrier removal Culvert repair/replacement Upstream storage retrofit Image: constraint of the stream repair Other: Image: constraint of the stream repair Other: Is SC ACTING AS GRADE CONTROL Image: constraint of the stream repair Other: Image: constraint of the stream repair Other: If yes for Fortal Partial Partial A structure such as a dam or road culver on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present. A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish. A temporary barrier such as a dam or road culver on a 3rd order or greater stream blocking the upstream movement of anadromous fish. A total fish blockage that may interfere with the migration of anadromous fish. If yes for Flow too shallow Water Drop: Image: movement of anadromous fish, no fish passage device present. A total fish blockage that may interfere with the migration of anadromous fish. Image: movement of the stream structure stream blocking the upstream movement of anadromous fish. A total fish double as the very head of a stream with above it; natural barriers such as a waterfalls. Image: movement of the stream structure struct	ONLY		n 🗌 Downstream	n scour hole	🗌 FI	at			(ft)
Image: Seventing as GRADE CONTROL Image: Seventing as GRADE CONTROL Image: Seventing as GRADE CONTROL Is SC ACTING AS GRADE CONTROL Image: Seventing as GRADE CONTROL Image: Seventing as GRADE CONTROL Image: Seventing as GRADE CONTROL If yes for Image: Seventing as Grade Control If yes for Image: Seventing as Grade Control Image: Seventing as Grade Contro Image: Seventing as Grade Contro I		1 2 10		ankment			Roadway	elevation	: <u> </u>
EXTENT OF PHYSICAL BLOCKAGE: BLOCKAGE SEVERITY: (circle #) Protal Partial Temporary Unknown If yes for Fish barrier CAUSE: Proto too high Water Drop: Proceeding Image: Drop too high Water Drop: Proc		RESTORATION CANDIDATE			-	eplacement	Upstream s	torage retr	rofit
EXTENT OF PHYSICAL BLOCKAGE: BLOCKAGE SEVERITY: (circle #) Protal Partial Temporary Unknown If yes for Fish barrier CAUSE: A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish. A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish. A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish. A total fish blockage that may interfere with the migration of anadromous fish. A total fish blockage that may interfere with the migration of anadromous fish. A total fish blockage that may interfere with the migration of anadromous fish. A total fish blockage that may interfere with the migration of anadromous fish. A total fish blockage that may interfere with the migration of anadromous fish. A total fish habitat above it, natural barriers such as waterfalls.	IS SC ACTING	G AS GRADE CONTROL		es 🗍 Unk	nown				
If yes for Image: Cause: Image: Cause: <th></th> <td></td> <td></td> <td></td> <td></td> <td>OCKAGE SEVE</td> <td>RITY: (circ</td> <td>:le #)</td> <td></td>						OCKAGE SEVE	RITY: (circ	:le #)	
		Total Partial Temporary Unknow CAUSE: Drop too high Prove too shallow Water D	wn rop: <u>4B (</u> in)	road culvert on a greater stream b upstream moven anadromous fish	as a dam or 3rd order or locking the nent of ; no fish	A total fish blocka tributary that wou significant reach or partial blockag interfere with the	age on a uld isolate a of stream, je that may migration of	A tempora beaver da the very h very little v above it; r	im or a blockage at lead of a stream with viable fish habitat hatural barriers such
NOTES/SKETCH:	<u>p</u>			5		4 (3))	2	1
)	cn.							

Reach Level Assessment

SURVEY REACH	D. <u>6857-04</u> 9W	rrshd/Subshd:	Ble South This	Date: <u>6 / 5</u>	_10% AS	SESSED BY:
	e: <u>2</u> : <u>35</u> am/pn			3_: <u>05_</u> AM/PM	LMK:	GPS ID:
LAT 41 ° 51 ']	<u>4.1</u> " Long	72 . 25 105.5 "	LAT <u>UI º 5/ '</u>	07.4 " LONG <u>7</u>	2°25 V	35 "
DESCRIPTION:		*	DESCRIPTION:			с.
				<u> </u>		
RAIN IN LAST 24 HC		□ Steady rain	PRESENT CONDITIONS		-	ain 🗆 Intermittent
□ None			Clear		Overcas	
SURROUNDING LAN		l 🗆 Commercial urse 🗆 Park	□ Urban/Residential □ Crop	⊡ Suburban/Res □ Pasture	Forested	□ Institutional
AVERAGE	CONDITIONS (che	ck applicable)	REACH	SKETCH AND SIT	E IMPACT	TRACKING
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	☑ 50%-75% □ 75-100%	within the survey re	of survey reach. Tra ach (OT, ER, IB,SC, deemed appropriate.	UT, TR, MI) as	nd IDs for all site impacts s well as any additional ction of flow
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5	slick) C C	obble (2.5 –10") oulder (>10") ed rock		uccinen eppi opi ene.	male and	
WATER CLARITY	aturally colored) 🛛					
AQUATIC PLANTS IN STREAM		e \square some \square lots e \square some \square lots				
WILDLIFE IN OR AROUND STREAM	(Evidence of) ☐ Fish ☐ Beav ☐ Snails ☐ Othe	er Deer		Share 1 San 1 S		
STREAM SHADING (water surface)	☐ Mostly shaded ☐ Halfway (≥50% ☐ Partially shaded ☐ Unshaded (< 25	‰) d (≥25%)		StoneWell 6-1		
CHANNEL	Downcutting	Bed scour		J.		
DYNAMICS	Widening	Bank failure		ž.		
Unknown	Headcutting Aggrading Sed. deposition	Bank scour Slope failure	Star School	Harl Walt		
•	Height: LT bank	L/ (ft)	5			
CHANNEL DIMENSIONS	RT bank	(ft)				
(FACING	Width: Bottom	$\frac{1}{10}$ (ft)				
DOWNSTREAM)	Тор	$\frac{3}{30}$ (ft)				
a	EACH ACCESSIBILI			and the second se		
Good: Open area in	Fair: Forested or	Difficult. Must cross		(Linear Street)		
public ownership,	developed area	wetland, steep slope, or				
sufficient room to	adjacent to stream. Access requires tree	sensitive areas to get to stream. Few areas to		WHER OT-	1	
stockpile materials, easy stream channel	removal or impact to	stockpile available	and a second	aan ah		
access for heavy	landscaped areas.	and/or located a great	I-84	l		
equipment using	Stockpile areas small or distant from	distance from stream. Specialized heavy		n an de le general de la constant d	*	
existing roads or trails.	stream.	equipment required.				
5 4						
NOTES: (biggest prob	iem you see in survey	reachj		X		
				REPORT	FED TO AUTH	ORITIES YES NO

	Optimal	Suboptimal	Marginal	Poor
N-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lad of habitat is obvious; substrate unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambar surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetatio has been removed to 5 centimeters or less in average stubble height.
	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to propert or infrastructure.
	Left Bank 10 /9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION No Hootplan WPC Sugin	20 (19) 18 17 16	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched. 15 14 13 12 11	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched. 10 9 8 7 6	High flows (greater than bankfull not able to enter floodplain. Stream deeply entrenched. 5 4 3 2 1 0
	Over	ALL BUFFER AND FLOODPLAI	IN CONDITION	
	Optimal	Suboptimal	Marginal	Poor
Vegetated Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: littl or no riparian vegetation due to human activities.
	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	Right Bank (0) 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetatio type is turf or crop land
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Francisco de la composición de la composi Composición de la composición de la comp	No evidence of floodplain encroachment in the form of fill material, land development, or	Minor floodplain encroachment in the form of fill material, land development, or manmade structures,	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on
Floodplain Encroach- ment	manmade structures	but not effecting floodplain function	effect on floodplain function 10 9 8 7 6	floodplain function 5 4 3 2 1 0

WATERSHED/SUBSH	ED:	ents & A. T.L	DATE: 61510	ACCE	SSED BY:	
SURVEY REACH ID:		Гіме: <u>2:4/0</u> ам/рм	PHOTO ID: (Camera-H			90000
SITE ID (Condition-#):	a recent for the fight	LAT <u>41 ° 51 '14.1_</u> " L	ONG <u>12 ° 25 ' 05 5</u>	<u>"" LMK</u>		SPS: (Unit ID)
BANK: LT RT Head FLOW: None Trickle	Closed	MATERIAL: Concrete Metal PVC/Plastic Brick Other:	SHAPE: Single Circular Double Elliptical Triple		SIONS: r:(in)	SUBMERGED:
Moderate Substantial	Open channel	Concrete Earthen Other: $\gamma_i \rho_i r_{ap}$	Parabolic y	Depth: Width (Top): " (Bottom):		NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: ☑ No □Gas □ Sewage □Rancid/Sour □ Sulfide □ Other:	⊠ None □Oily	VEGGIE DENSITY: None Normal Inhibited Excessive Other:	Brown Other: POOL Qt Good	Orange]No pool]Colors
ONLY FLOAT OTHER Ex	DITY: DITY: TABLES: No cess Trash (paper/p	ne 🗌 Sewage (toilet paper, o plastic bags) 🗌 Dumping	Cloudy Opaque etc.) Petroleum (bulk) Excessive		Red Dot	
ONLY FLOAT OTHER EX CONCERNS: Ne POTENTIAL RESTOR	TABLES: No cess Trash (paper/p eds Regular Maint ATION CANDIDA	ne 🗌 Sewage (toilet paper, o plastic bags) 🔲 Dumping	Cloudy Opaque Cloudy Petroleum (bulk) Excessive sion Other:	(oil sheen) Sedimentati	Oth on	1er:
ONLY FLOAT OTHER Ex CONCERNS: Ne POTENTIAL RESTOR no If yes for daylighting:	TABLES: No cess Trash (paper/p eds Regular Maint ATION CANDIDA	ne Sewage (toilet paper, o plastic bags) Dumping enance Bank Ero TE Discharge investigatio	Cloudy Opaque Cloudy Opaque Cloudy Petroleum (bulk) Excessive sion Other:	(oil sheen) Sedimentati	Oth on	tfall stabilization
ONLY FLOA: OTHER Ex CONCERNS: Ne POTENTIAL RESTOR no If yes for daylighting: Length of vegetative cor If yes for stormwater: s stormwater currently	TABLES: No cess Trash (paper/p eds Regular Maint ATION CANDIDAT ver from outfall:	ne Sewage (toilet paper, o plastic bags) Dumping enance Bank Ero TE Discharge investigatio Storm water retrofit ft Type of exist Land Use des	Cloudy Opaque Cloudy Opaque Cloudy Petroleum (bulk) Excessive sion Other:	(oil sheen) Sedimentati	Oth on eam repair/ou	tfall stabilization
ONLY FLOA: OTHER Ex CONCERNS: Ne POTENTIAL RESTOR. no If yes for daylighting: Length of vegetative cor If yes for stormwater: Is stormwater currently Yes No OUTFALL He SEVERITY: Store Carcele #) Store	TABLES: No cess Trash (paper/p eds Regular Maint ATION CANDIDAT ATION CANDIDAT ver from outfall:	ne Sewage (toilet paper, o plastic bags) Dumping enance Bank Ero TE Discharge investigatio Storm water retrofit ft Type of exist Land Use des Area available istinct color and/or a of discharge is significant of normal flow in receiving s to be having a	Cloudy Opaque Cloudy Opaque Cloudy Petroleum (bulk) Excessive sion Other:	(oil sheen) Sedimentation Local structure bodorless. If the mount of stream's base	Oth on on Slope: Outfall does n discharge; sta	tfall stabilization
ONLY FLOA: OTHER Ex CONCERNS: Ne POTENTIAL RESTOR. no If yes for daylighting: Length of vegetative cor If yes for stormwater: Is stormwater currently Yes No OUTFALL He SEVERITY: Store Carcele #) Store	TABLES: No cess Trash (paper/p eds Regular Maint ATION CANDIDAT ver from outfall:	ne Sewage (toilet paper, o plastic bags) Dumping enance Bank Ero TE Discharge investigatio Storm water retrofit ft Type of exist Land Use des Area available istinct color and/or a of discharge is significant of normal flow in receiving s to be having a	Cloudy Opaque Cloudy Opaque Cloudy Opaque Cloudy Petroleum Cloudy Excessive Sion Other:	(oil sheen) Sedimentation Local structure bodorless. If the nount of stream's base / localized.	Oth on on Slope: Outfall does n discharge; sta	ner: Itfall stabilization ot have dry weather ining; or appearance

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Stream Crossing SC

WATERSHED	/SUBSHED: Control Br	est soul 7	rite	DATE: 6	15108	ASSE	SSED BY: DZT	
	CHID: GEST-OMA	Тіме: 💋 : 23	a second		: (Camera-Pic		No	
SITE ID: (Con	dition #) SC- <u>2 </u> LAT	41_051_DTS	'' Long 72			MK	GPS (Unit ID)	
TYPE: 🗌 Roa	ad Crossing 🔲 Railroad Crossi	ng 🔣 Manmade	Dam 🗌 Beaver	Dam	Geological Form	nation 🔲	Other:	
For Road/ Railroad Crossings	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS:	MATERIAL: Concrete Metal Other:	Flc	NMENT: ow-aligned t flow-aligned o not know	Barrel dia	Height:(
ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	n 🗌 Downstream		Fla	CULVERT SLOPE: \Box Flat \Box Slight (2° – 5°) \Box Obvious (>5°)		Culvert length:(Width:(Roadway elevation:	
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re			placement 🗌 l	- 4	orage retrofit	
IS SC ACTIN	G AS GRADE CONTROL				and a second s	<u> </u>		
	EXTENT OF PHYSICAL BLC	CKAGE:	[BLO	CKAGE SEVER	UTY: (circi	le #)	
If yes for fish barrier	X Total Partial Temporary Unknow CAUSE: Drop too high Value Partial Flow too shallow Water D Other: Other:	rop: <u>42</u> (in)	A structure such as road culvert on a 3 greater stream bloo upstream moveme anadromous fish; r passage device pre	rd order or cking the nt of o fish esent.	A total fish blocka tributary that woul significant reach o or partial blockag interfere with the anadromous fish.	d isolate a of stream, e that may migration of	A temporary barrier such a beaver dam or a blockage the very head of a stream very little viable fish habitat above it; natural barriers su as waterfalls.	
 Notes/Sket			5		4 3	<u>}</u>	2 1	
	GEDMENT							
2					Repor	TED TO AU1	THORITIES 🗌 YES 🗌	

Reach Level Assessment RCH

							L	
SURVEY REACH]	D:630.04 } W	rrshd/Subshd: 🖧 🐖	Br Sour	l THIL	DATE: 6/5	_/ <u>08</u> Ass	essed by: DRB	
	ie: <u>2</u> :25 AM/PN	1 LMK:	END	TIME:	:AM/PM	LMK:		GPS ID:
LAT 0 0 51 '	01.9" LONG?	2.025 05.5"	LAT M	° 🤹 '	53.1 " LONG]	2025 10	3.9 "	
DESCRIPTION:			DESCRIP	- Capeline		<u>\$075</u>	- <u></u>	
					······································			
RAIN IN LAST 24 HO	ours 🗆 Heavy rain	□ Steady rain	PRESENT C	ONDITIONS	□ Heavy rain	□ Steady rai	n 🗆 Intern	nittent
□ None	🖾 Intermitten		□ Clear		□ Trace	🖾 Overcast	Partly	/ cloudy
SURROUNDING LAN		l □ Commercial rse □ Park	□ Urban/R □ Crop	esidential	☑ Suburban/Res □ Pasture	Forested Other:	🗆 Institu	itional
AVERAGE	CONDITIONS (che	ck applicable)		REACH	SKETCH AND SI	ГЕ ІМРАСТ Т	RACKING	
BASE FLOW AS %	□ 0-25%	⊠-50%-75%	Simple pl		of survey reach. Tra			ite impacts
CHANNEL WIDTH	□25-50 %	□ 75-100%	within t	the survey re	each (OT, ER, IB,SC,	UT, TR, MI) as 1	vell as any a	dditional
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5	slick)	obble (2.5 –10") oulder (>10") ed rock	A	and the second	deemed appropriate	1.	on of flow	
WATER CLARITY	aturally colored)				Re bere			
AQUATIC PLANTS IN STREAM	÷.	e \Box some \Box lots e \Box some \Box lots) aburlar	العر		
Wildlife in or Around Stream	(Evidence of) □ Fish □ Beav	N		Control of the second s Second second secon second second sec	- lower			
STREAM SHADING (water surface)	 ☑ Mostly shaded ☑ Halfway (≥50% □ Partially shaded □ Unshaded (< 25%) 	(≥75% coverage) 6) 1 (≥25%)		y - which are the population of the state of		/ 		
CHANNEL Dynamics	Downcutting Widening	Bed scour Bank failure				Northin (1) the walk of the second		S.S.S.
Unknown	Headcutting Aggrading Sed. depositio	Bank scour Slope failure Channelized		1 -	and the second	e na na se de la constante de l		A.
CHANNEL	Height: LT bank	<u> </u>		weth		7		2
DIMENSIONS	RT bank	(ft)	Kananan		/ volan -	1		
(FACING DOWNSTREAM)	Width: Bottom	(ft)				California (California)	01	
	Тор	<u>(ft)</u>	January 1			No sa negocia da	31	1 VONT
R	EACH ACCESSIBILI	ГҮ	14015			(in the state of t	C351-06	
Good: Open area in	Fair: Forested or	Difficult. Must cross		J.B-0		read or plant of	96	
public ownership,	developed area adjacent to stream.	wetland, steep slope, or sensitive areas to get to		10-	1 Al	Connolition of the second	the state of the	티 /
sufficient room to stockpile materials,	Access requires tree	stream. Few areas to	-		13/1	200-Linkson	5	18-X
easy stream channel	removal or impact to	stockpile available			\$()	nepholasius	V T	A B
access for heavy	landscaped areas. Stockpile areas	and/or located a great distance from stream.			A second s	~~~	- 3.	5-1 2
equipment using existing roads or trails.	small or distant from	Specialized heavy		and a second	N ASTRONOLO	1		
5 4	stream.	equipment required.	- 62			IN	and the second	A
NOTES: (biggest prob		reach)				134		
)								
					D		— .	
					REPOR	TED TO AUTHO	RITIES	(es [] No

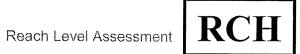
	Optimal	Suboptimal	Marginal	Poor		
N-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.		
	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
Floodplain Connection	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.		
	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
		ALL BUFFER AND FLOODPLAI	N CONDITION			
	Optimal	Suboptimal	Marginal	Poor		
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.		
	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
FLOODPLAIN Predominant floodplain vegetation to is mature forest		Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
		Successive A				

IR Impacted Buffer WATERSHED/SUBSHED: BLSach DATE: 6/5/08 IVID ASSESSED BY: DRR **URVEY REACH:** PST-OYR TIME: 2: ZO AMPM PHOTO ID: (Camera-Pic #) 1# ranks SITE ID: (Condition-#) GPS: (Unit ID) START LAT 41 ° 51 '07.9" LONG 72 ° 25 '055" LMK **IB-** 6 o END LAT " LONG ** LMK REASON INADEQUATE: 🕅 Lack of vegetation 🕅 Too narrow 🗌 Widespread invasive plants IMPACTED BANK: LT KRT Both Recently planted Other: LAND USE: Private Institutional Golf Course Park Other Public UNKNOW (Facing downstream) LT Bank \Box : ম RT Bank \square \Box : DOMINANT Paved Bare ground Turf/lawn Tall grass Shrub/scrub Trees Other LAND COVER: LT Bank X RT Bank \Box X X \square <u></u>: **INVASIVE PLANTS:** □ None Rare Partial coverage Extensive coverage unknown STREAM SHADE PROVIDED?
None Partial 🗌 Full WETLANDS PRESENT? No Yes Unknown POTENTIAL RESTORATION CANDIDATE Active reforestation Greenway design 🛛 Natural regeneration 🗍 Invasives removal 🗌 no Other: **RESTORABLE AREA** Impacted area on public land Impacted area on either Impacted area on private where the riparian area does public or private land that is land where road; building REFORESTATION LT BANK RT not appear to be used for any presently used for a specific encroachment or other **POTENTIAL:** Length (ft): whiteessor œ specific purpose; plenty of purpose; available area for feature significantly limits (Circle #) area available for planting planting adequate available area for planting Vidth (ft): 5 4 53 **POTENTIAL CONFLICTS WITH REFORESTATION** Widespread invasive plants Detential contamination Lack of sun Deor/unsafe access to site Existing impervious cover Severe animal impacts (deer, beaver) ownership NOTES: Merg PROM Scrub Sharlo 430 vanin MUCHI

Stream Crossing

117.	1	. Phi and i	,	D	15 1000	1	
	SUBSHED: (10/13 Bread	<u>- 70th</u> 1nh TIME: 3 : 15		DATE: <u>6</u>			SED BY: /# 43
	CH ID: GB3T4046				D: (Camera-Pic		3
SITE ID: (Con	dition-#) SC- <u>O</u> L	AT <u>41 ° 51 '03.</u>	$_$ "LONG $_$		<u></u> "LI	ИК	GPS (Unit ID)
TYPE: 🗌 Roa	ad Crossing 🔲 Railroad Cro	ossing 🔲 Manmade	Dam 🗌 Beaver	Dam	Geological Form	nation 🔲 (Other:
For Road/ Railroad	SHAPE: Arch Bottomles Box Elliptical Circular Other:	# BARRELS: S S Single Double Triple Other:	MATERIAL: Concrete Metal Other:	ALIG Flo	NMENT: ow-aligned of flow-aligned o not know	DIMENSIC Barrel dian	DNS: (if variable, sketch) neter: <u>\$</u> (ft) Height: <u></u> (ft)
CROSSINGS ONLY	CONDITION: (Evidence of Cracking/chipping/corro Sediment deposition Other (describe):	sion Downstrear		Fla	VERT SLOPE: at gpht $(2^{\circ} - 5^{\circ})$ pvious (>5°)		ugh: $\underline{\mathcal{Y}}$ (ft)Width: $\underline{\mathcal{S}}$ (ft)elevation: $\underline{\mathcal{D}}$ (ft)
		l					
POTENTIAL I	RESTORATION CANDIDAT	E Fish barrier re	•		placement 🗌 U	Jpstream sto	orage retrofit
	G AS GRADE CONTROL						
	EXTENT OF PHYSICAL F				CKAGE SEVER	ITY: (circle	» #)
If yes for fish barrier	Total Part Temporary Uni	ial nown Drop: (in)	A structure such as road culvert on a 3 greater stream bloo upstream movemen anadromous fish; n passage device pre	a dam or rd order or cking the nt of o fish esent.	A total fish blocka tributary that woul significant reach c or partial blockage interfere with the r anadromous fish.	ge on a d isolate a f stream, e that may nigration of	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.
NOTES/SKET			5		4 3		2 (1)
NOTES/SKET		Loehr Rd	SCH				
L			<u></u>		REPOR	FED TO AUT	HORITIES 🗌 YES 🗌 NO

- ``



SURVEY REACH ID: GBST-9A WTRSHD/SUBSHD: GASES BL & TID DATE: 615108 ASSESSED BY: DB J4W SM
START TIME: \square
LAT 41 051 103,1 " LONG 72025 1069 " LAT 41 051 100.7 " LONG 720 25 1 1017"
DESCRIPTION: DESCRIPTION:
RAIN IN LAST 24 HOURS 🗆 Heavy rain 🖆 Steady rain PRESENT CONDITIONS 🗆 Heavy rain 🗆 Steady rain 🗆 Intermittent
None Intermittent Trace Clear Trace Overcast Partly cloudy
GURROUNDING LAND USE: Industrial Commercial Urban/Residential Suburban/Res Forested Institutional Golf course Park Crop Pasture Other:
AVERAGE CONDITIONS (check applicable) REACH SKETCH AND SITE IMPACT TRACKING
BASE FLOW AS % □ 0-25% □ 50%-75% Simple planar sketch of survey reach. Track locations and IDs for all site impacts CHANNEL WIDTH □ 25-50 % □ 75-100% Simple planar sketch of survey reach (OT, ER, IB,SC, UT, TR, MI) as well as any additional features deemed appropriate. Indicate direction of flow
DOMINANT SUBSTRATE Silt/clay (fine or slick) Cobble (2.5 -10") Sand (gritty) Boulder (>10") Gravel (0.1-2.5") Bed rock
VATER CLARITY Clear Turbid (suspended matter) Stained (clear, naturally colored) Opaque (milky) Other (chemicals, dyes)
AQUATIC PLANTS Attached: Inone I some I lots N STREAM Floating: Inone I some I lots
WILDLIFE IN OR (Evidence of) AROUND STREAM Image: Stream of the stream of t
□ Mostly shaded (≥75% coverage) □ Halfway (≥50%) □ Halfway (≥50%) □ Partially shaded (≥25%) □ Unshaded (< 25%)
CHANNEL Downcutting Bed scour DYNAMICS Widening Bank failure Headcutting Bank scour
Unknown Aggrading Slope failure Sed. deposition Channelized
CHANNELHeight: LT bank 5 (ft)DIMENSIONSRT bank 5 (ft)FACING OWNSTREAM)Width: Bottom 3 (ft)Top $/2$ (ft)
REACH ACCESSIBILITY
ood: Open area in ublic ownership, ufficient room to ockpile materials, asy stream channel ccess for heavy quipment using kisting roads or trails.Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas small or distant from stream.Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.Sc-1 C G B ST-9854321
OTES: (biggest problem you see in survey reach)

REPORTED TO AUTHORITIES YES NO

	Optimal	Suboptimal	Marginal	Poor	
N-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0	
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetatior has been removed to 5 centimeters or less in average stubble height.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.	
	Left Bank 10 9	8 6 6	5 4 3	2 1 0	
	Right Bank 10 9	8 0 6	5 4 3	2 1 0	
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	
	The second se	ALL BUFFER AND FLOODPLA		<u>(5)</u> 4 3 2 1 0	
	Optimal	Suboptimal	Marginal	n	
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Wargman Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Poor Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 (4) 3	2 1 0	
FLOODPLAIN Vegetation	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land	
	20 19 18 17 16	15 14 13 12 11	10 9 🛞 7 6	5 4 3 2 1 0	
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 (4) 3 2 1 0	
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function	

Stream Crossing

WATERSHED	SUBSHED: GAJES BLE S	. Trib		DA	те: <u>6</u>	15 108	ASSE	CSSED BY:
	CHID: GBST-9A	Тіме::	_AM/PM	Рн	ото П	: (Camera-Pic	: #)	1#1844
SITE ID: (Cond	dition-#) SC LAT	41 0 51 102.	6 "Long	<u>°_2</u> °_	25 !	<u>10.2</u> " LI	ИК	GPS (Unit ID)
TYPE: Roa	d Crossing 🔲 Railroad Crossi	ng 🗌 Manmade	Dam 🗌 Beav	er Da	ım 🗌	Geological Form	nation	Other:
For Road/ Railroad	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS:	MATERIAL:		Flo	NMENT: w-aligned t flow-aligned not know	Barrel dia	Height:(ft)
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	Downstream			⊠ Fla □ Sli	ERT SLOPE: it ght (2° – 5 ⁰) vious (>5°)	Culvert le	ength: 30 (ft) Width: 10 (ft) r elevation: 4 (ft)
POTENTIAL F	RESTORATION CANDIDATE	 Fish barrier re Local stream 			epair/rej	placement 🔲 U	Jpstream s	torage retrofit
IS SC ACTING	G AS GRADE CONTROL	No Y	es 🗌 Unl	cnowr	1			
	EXTENT OF PHYSICAL BLO	CKAGE:			BLO	CKAGE SEVER	UTY: (circ	cle #)
If yes for fish barrier	Total Partial Temporary Unknow CAUSE: Drop too high Water Dr Flow too shallow Water Dr Other:	op: (in)	A structure such road culvert on a greater stream b upstream moven anadromous fish passage device	a 3rd or locking nent of ; no fis presen	der or the h t.	A total fish blocka tributary that woul significant reach o or partial blockage interfere with the r anadromous fish.	d isolate a of stream, e that may	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.
<u>/</u> Notes/Sket(5			4 3	(2 1
			t d					
х.		Loel	hr Rd					
)						Repor	TED TO AU	THORITIES 🗌 YES 🗌 NO

WATERSHED	SUBSHED: GARES BL	s Trib		DATE: 6 /	5108	ASSESSI	ED BY: イルン
1	CHID: GRST-9A	TIME::		ното ID: ((Camera-Pic		1# 1846-48
SITE ID: (Con	dition-#) SC LAT	41 0 51 1 00	"→" Long <u>7</u> 2			MK	GPS (Unit ID)
TYPE: 🗌 Roa	d Crossing 🔲 Railroad Crossi	ng 🖾 Manmade I	Dam 🗌 Beaver	Dam 🗌 Geo	ological Form	nation 🔲 Ot	her:
For Road/ Railroad	SHAPE: Bottomless Arch Bottomless Box Elliptical Circular Other:	# BARRELS: Single Double Triple Other:	MATERIAL: Concrete Metal Other:	ALIGNMI	aligned ow-aligned	Barrel diame	NS: (if variable, sketch) eter: <u>Unle</u> (ft) eight: <u>Unle</u> (ft)
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosio Sediment deposition Other (describe):	n 🗌 Downstrean 🗌 Failing emb		CULVER	$(2^{\circ}-5^{0})$	Culvert lengt Wi Roadway ele	idth: <u>UNU</u> (ft)
🗌 no	RESTORATION CANDIDATE	Fish barrier re Local stream n No			ement 🗌 U	Jpstream stora	age retrofit
If yes for fish barrier	EXTENT OF PHYSICAL BLC Total Partial Temporary Unkno CAUSE: Drop too high Water D Flow too shallow Water D Other:	wn rop: (in)	A structure such as road culvert on a 3r greater stream bloc upstream movemer anadromous fish; n passage device pre	a dam or A d order or tritk king the sig t of or o fish int sent. an	total fish blocka butary that woul gnificant reach c partial blockage terfere with the r nadromous fish.	d isolate a be of stream, the e that may ve migration of ab as	#) temporary barrier such as a baver dam or a blockage at e very head of a stream with ary little viable fish habitat bove it; natural barriers such s waterfalls.
/ Notes/Sket			5	4	3	2	<u> </u>
		Embanhmen	<u>}</u>				

diam: unler

REPORTED TO AUTHORITIES YES NO

Reach Level Assessment

SURVEY REACH]	D: <u>CBT_076</u> WT	RSHD/SUBSHD:	ses Broke Suit	DATE: <u>6 / 5</u>	Asse	ESSED BY:
Start Tim	е: <u>3_</u> : <u>49</u> АМ/РМ)	END TIME:	: <u>22</u> AM/PM	> LMK:	GPS ID:
LAT41 º 50 '	5 <u>4.7</u> " Long 7	2°25 115"	LAT410 5014	14.5" LONG 72	2°27 104	
DESCRIPTION:			DESCRIPTION:		····	
RAIN IN LAST 24 HO	•	□ Steady rain	PRESENT CONDITIONS	🗆 Heavy rain	□ Steady rair	Intermittent
□ None	☐/Intermittent		Clear		□ Overcast	Partly cloudy
SURROUNDING LAN		Commercial Commercial rse Park		☑ Suburban/Res □ Pasture	Forested Other:	□ Institutional
AVERAGE	CONDITIONS (chec	ck applicable)	REACH S	SKETCH AND SIT	ГЕ ІМРАСТ ТІ	RACKING
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	⊠ ⁷ 50%-75% □ 75-100%	within the survey rea	of survey reach. Tra ach (OT, ER, IB,SC, deemed appropriate.	UT, TR, MI) as w	IDs for all site impacts vell as any additional on of flow
DOMINANT SUBSTR □ Silt/clay (fine or □ Sand (gritty) ☑ Gravel (0.1-2.5	slick) 🗐 Čco B B B C	bble (2.5 –10") pulder (>10") d rock			1-0-2	<i>m oj jiow</i>
WATER CLARITY Stained (clear, n Other (chemicals,	aturally colored) 🛛 dyes)	Opaque (milky)	_	THE.	en anderen Maria II er	
AQUATIC PLANTS IN STREAM		e \Box some \Box lots		a positive and the second s		
WILDLIFE IN OR AROUND STREAM	(Evidence of) ☑ Fish □ Beave □ Snails □ Other					
STREAM SHADING (water surface)	 ☑ Mostly shaded (□ Halfway (≥50% □ Partially shaded □ Unshaded (< 25) . (≥25%)	ER-1	∫E,	Ŕ-1	
CHANNEL	Downcutting	Bed scour				
DYNAMICS	Widening	Bank failure				
Unknown	Headcutting Aggrading Sed. deposition	Bank scour Slope failure Channelized				
CHANNEL	Height: LT bank	(ft)		1		
DIMENSIONS	RT bank	(ft)				
(Facing downstreaM)	Width: Bottom	(ft)				
DOWNSTREAM)	Тор	(ft)				
R	EACH ACCESSIBILIT			And the second se		
Good: Open area in	Fair: Forested or developed area	Difficult. Must cross				
public ownership, sufficient room to	adjacent to stream.	wetland, steep slope, or sensitive areas to get to				
stockpile materials,	Access requires tree removal or impact to	stream. Few areas to		λ		,
easy stream channel access for heavy	landscaped areas.	stockpile available and/or located a great	Pont	dy)		
equipment using	Stockpile areas	distance from stream.				
existing roads or trails.	small or distant from stream.	Specialized heavy equipment required.				
5 4	. (3) 2	1	1			
NOTES: (biggest prob	lem you see in survey r	reach)				
£						
				REPORT	FED TO AUTHOR	RITIES 🗌 YES 🗌 NO

<u>}</u>	Optimal	Suboptimal	Marginal	Poor
N-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetatior has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	Over	ALL BUFFER AND FLOODPLAI	N CONDITION	
	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.
	Left Bank (10.) 9	8 7 6	5 4 3	2 1 0
	Right Bank (10 ⁷) 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land
	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15(14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function
	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

÷ 9

Goges Bk South Trib 6/5/08 DRB ER 0-B5T-093 4:00 DBCanon 1852 ER-01 41°50' 53.8" 72° 25% 12. other severe crountie 41°50'50.1" 72°25'09.7" 72° 25% 12.0" Bouh Scow/Jailure Bark of concern: outsick corren of wearders bength 2 sections 80' éach other smalter, older sconarg Bot width = 8' Top w = 25' welked w= 3' I-orest Bank stabilization, glade caribal No threat is projacity scow height is "A mat etisting upanian width = 100 + ft enosion sevening = Y Access = 1 crosion->

Stream	Cros	eina
Suedin	0105	Sing

Stream Crossing	SC

		•			,		
WATERSHED	SUBSHED: Corres Goode Sand	4 Tri	(<u>)</u>	DATE: _	615108	ASSES	SSED BY:
	1	4:12		Рното	D: (Camera-Pic	:#) [M 14153
 Construction of the second s Second second se Second second s		<u>50 ' 61</u>	2 <u>6</u> " Long <u>7</u> 2	2°24	<u>n(0</u> " LI	MK	GPS (Unit ID)
	ad Crossing 🔲 Railroad Crossing 🔲 N	Aanmade	Dam 🔲 Beaver	r Dam [Geological Form	nation	Other:
For Road/ Railroad Crossings	Circular Tri	gle uble ple	MATERIAL: Concrete Metal Other:		GNMENT: low-aligned Not flow-aligned Do not know	Barrel dia	Height: <u>15/a (ft</u>)
ONLY		ownstrear ailing emb	n scour hole bankment		L VERT SLOPE: ⁷ lat 3 [°] light (2° – 5 [°]) Dbvious (>5°)		Width: 1500 (ft) elevation: 3 (ft)
POTENTIAL]		ı barrier re al stream			replacement 🔲 l	Jpstream sto	orage retrofit
	G AS GRADE CONTROL		-				
15 5C ACTIN	EXTENT OF PHYSICAL BLOCKAGE				LOCKAGE SEVEF	RITY: (circl	le #)
If yes for fish barrier	Total Partial Temporary Unknown CAUSE: Drop too high Water Drop: 5 Flow too shallow Water Depth:	(in)	A structure such as road culvert on a 3 greater stream bloo upstream moveme anadromous fish; r passage device pre	s a dam or rd order or cking the ent of no fish	A total fish blocka tributary that wou significant reach o or partial blockag interfere with the anadromous fish.	age on a Id isolate a of stream, e that may migration of	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.
)	Other:		5		4 3)	2 1
NOTES/SKET		1 D		nific po Like po manony			
)					REPOR	TED TO ALL	THORITIES 🗌 YES 🗌 NO
	·····						

5C Gages Brook South Trib GB37.09B 4:15pm B37.09B 4:15pm 6/5/08 Canor 56-02 Lot 41051'495" Long. 72°25'09.1" 6/5/0% Canon, 57-58 Type: road crossing Ressel: one material concrete Alignment flow al. Shape: bottomless Amensions. Oramoter 24in Culvert Lenght: WOGL Roding elevation: 356 Condition Chipping Culvert slope: 2250 Restoration Candidate: No Blockage severity. 4 Water Drop. 40ft

Reach Level Assess

ach Level Assessm	ient	R	CH
Date: <u>615108</u>	Asses	SSED BY:	
2: <u>32</u> am/pm LM	К:		GPS ID:

SURVEY REACH ID: CB-ON WTRSHD/SUBSHD	Cages	Date: <u>615108</u>	Assessed by:
START TIME: <u>Q</u> : <u>B</u> AMYPM LMK: _	$_ O END TIME: _$	0:32 AM/PM LM	IK: GPS ID:
LAT <u>41 ° 51 ' 105" LONG 12º 25 '3</u>	T." LAT 41 ° 51 '-	<u>E.</u> L" LONG <u>72°25</u>	129.11
Description:	DESCRIPTION:		
RAIN IN LAST 24 HOURS 🗆 Heavy rain 🛛 Steady ra	in PRESENT CONDITIONS	□ Heavy rain □ Stea	de noin 🗂 Internettent
□ None □/Intermittent □ Trace		Trace Over	ldy rain □ Intermittent ercast □ Partly cloudy
	nercial 🗌 Urban/Residential	□ Suburban/Res □ Fore	sted 🗆 Institutional
AVERAGE CONDITIONS (check applicable)		Pasture Oth SKETCH AND SITE IMPA	
BASE FLOW AS % □ 0-25%			ns and IDs for all site impacts
CHANNEL WIDTH $\Box 25-50\%$ $\Box 75-10$	0% within the survey real	ach (OT, ER, IB,SC, UT, TR, M	AI) as well as any additional
	features	deemed appropriate. Indicate	direction of flow
DOMINANT SUBSTRATE \Box Silt/clay (fine or slick) \Box Cobble (2.5 –10"	0		
$\Box \text{ Sinverse (interest since)} \qquad \Box \text{ Source}(2.5-10)$ $\Box \text{ Boulder (>10")}$)		
\square Gravel (0.1-2.5") \square Bed rock	Bridge	19 29 19 mars	
WATER CLARITY Sclear Turbid (suspended ma			
□ Stained (clear, naturally colored) □ Opaque (milky □ Other (chemicals, dyes)			
		NEP	
AQUATIC PLANTS Attached: Inone I some	lots	AGB ST-01	
IN STREAM Floating: Inone I some I	lots	· · ·	
WILDLIFE IN OR (Evidence of)			
A BOUND STORE IN LIFISH LI Beaver LIDeer		Prising at	
AROUND STREAM Snails Other: Record the		at aller	
Mostly shaded (≥75% coverag	;e)	Nr ×	
STREAM SHADING (water surface) Halfway (250%) Partially shaded (225%)	· · · · · · · · · · · · · · · · · · ·	<u> </u>	
(water surface) \Box Partially shaded ($\geq 25\%$) \Box Unshaded ($\leq 25\%$)	FR.2	1ER-2	
		-	
CHANNEL Downcutting Bed sco			
DYNAMICS Widening Bank f		Y	
Headcutting Bank s			
Unknown Aggrading Slope f			
	natural-		
CHANNEL Height: LT bank	_(ft) Along		
DIMENSIONS RT bank	(ft)		
(FACING Width: Bottom	(ft) free		
DOWNSTREAM) Top 20-25	(ft)		
		S TÔ	
REACH ACCESSIBILITY		en i Malan	
Good: Open area in public ownership,	ana ar (16-215/1	aller	
sufficient room to adjacent to stream. sensitive areas to	oget to EK-	rec /	
stockpile materials, Access requires tree stream. Few are		nghinal & CM-61	
access for beavy landscaped areas. and/or located a	great	debons)	
equipment using Stockpile areas distance from str		l	
existing roads or trails. small or distant from Specialized heaves stream.		1	
5 4 3 (2) 1			
NOTES: (biggest problem you see in survey reach)	ALCHAD?		
) Constlur making pre tributary pa	n 0 01502		
		REPORTED TO A	UTHORITIES 🗌 YES 🗌 NO
		01100 IO A	

	Optimal	Suboptimal	Marginal	Poor
N-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habit of habitat is obvious; substra unstable or lacking.
	20 19 18 17 / 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the stream surfaces covered by vegetat disruption of streambank vegetation is very high; vege has been removed to 5 centimeters or less in aver stubble height.
	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall bank both sides of the stream eror a fast rate; erosion contributi significant amount of sedime stream; obvious threat to pro or infrastructure.
	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
	Right Bank 10 9	8 7 6	6 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched. 20 19 18 17 16	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched. 15 14 13 12 11	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than ban not able to enter floodplain. Stream deeply entrenched.
	Over	ALL BUFFER AND FLOODPLA	IN CONDITION	1
	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feel or no riparian vegetation due human activities.
	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0
	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain veget type is turf or crop land
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence standing/ponded water
	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1
				Cinnificant flandstate
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures 20 19 18 17 16	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill materia land development, or man-ma structures). Significant effect floodplain function 5 4 3 2 1 0

1.20 - 2

Trash and Debris

WATERSHED/SUE	SHED: Goog		DATE: <u>6/5</u>	108	ASSESSED BY:	
JURVEY REACH]	D: GB-61	TIME: <u>9</u> : <u>33</u> AM/PM	PHOTO ID: (Came	ra-Pic #) 🖾 🛵	n 1# 1510	
SITE ID: (Condition	-#) TR- <u>(~)</u> Lat_	°' Long	<u> </u>	" LMK_	GPS: (Unit ID)	
Entered a Endustr Residential Too fiber and	Ìal □P □Appliances ⅣY	aper Metal construction Medical Yard Waste Image: Construction for the second sec	SOURCE: I Unknown Flooding Iflegal dump Local outfall	DOCATION: Stream Riparian Are Lt bank Rt bank		
POTENTIAL REST	FORATION CANDIDATE	Stream cleanup Stream	n adoption segment	Removal/pro	evention of dumping	
If yes for trash or debris removal	EQUIPMENT NEEDED : Who can do it:	Heavy equipment Tra			DUMPSTER WITHIN 100 FT:	
CLEAN-UP POTENTIAL: (Circle #)	A small amount of trash (i.e., than two pickup truck loads) lo inside a park with easy access	cated with easy access. I rash ma	bulk items, in a small area y have been dumped over could be cleaned up in a		t of trash or debris scattered over a larg ccess is very difficult. Or presence of drum f hazardous materials	
	5	(4)	3	2	1	
NOTES:		Hence Baushpiles				
<u>)</u>	1	E		Reported	TO AUTHORITIES 🗌 YES 🗌 NO	

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WATERSHED	~	Cares			DATE: <u>6</u> / 3	5108	ASSESSED BY:		
SURVEY REA	<u>сн ID: [] /</u>	3-101	<u>Тіме:///:</u>	AM/PM	Рното І	D: (Camera-Pic #)(anon 1# 1815		
SITE ID: (Cond	dition-#)	START LAT 41	<u>51 '224"</u>	LONG <u>72</u>	<u>•25 1372 "</u>	LMK	GPS: (Unit ID)		
<u>CM-@)</u>		END LAT $\frac{U}{2}$	<u>°25 '37/</u> "	LMK	_				
TYPE: M Cha	nnelization	Bank armoring	Concrete ch	annel 🗌 Fl	oodplain encroach	nment 🗌 Other:			
MATERIAL:		Does channel hav	ve perennial fl	ow?	👿 Yes 🗌 No	DIMENSIONS:			
		Is there evidence	of sediment d	eposition?	Yes No	Height Bottom Width	(ft)		
Metal	∏ Rip Rap □ Earthen □ Metal		Is vegetation growing in channel?			Top Width:	$\frac{1}{32} \qquad (ft)$		
Other:		Is channel connec	cted to floodpl	ain?	Yes No	Length:	(ft)		
D top Er own	New				·····				
BASE FLOW C Depth of flow		(in)			ADJACENT ST	REAM CORRIDO	R		
	¥	1? 🔽 Yes 🗌 No			Available widt	h LT_10	\mathcal{O}^{\perp} (ft) RT $\mathcal{O}\mathcal{O}^{\perp}$ (ft)		
					Utilities Present? Fill in floodplain				
% of channel l	bottom <u>%</u>	<u> </u>			🗌 Yes 🗹 No	Yes 🗌 No			
POTENTIAL R	ESTORATIO	ON CANDIDATE [Structural re	oair 🗌 Bas	se flow channel cro	eation 🗌 Natural	channel design 🛛 Can't tell		
🗌 no		[De-channeliz		h barrier removal	🗌 Bioengi	-		
CHANNEL-	A long section	of concrete stream (>500)') A moderate	lenath (> 200') .t	out channel stabilized a		annel less than 100 ft with good water		
IZATION		e water is very shallow (<' natural sediments presen	tin beginning to	function as a na	tural stream channel.	depth, a hatur	al sediment bottom, and size and to the unchannelized stream reaches		
SEVERITY: (Circle #)	the channel.		Vegetated bars may have for			above and bel	low impacted area.		
Ļ		5	4	3			1		
NOTES:									

WATERSHED/SUBSHED: Goges DATE: 615108 ASSESSED BY: DBB
SURVEY REACH ID: 63-01 TIME: 10: 36 AM/PM PHOTO ID: (Camera-Pic #) DE Comp 1# 1617
SITE ID (Condition-#): OT-02 LAT 41 ° 51 '21-1 "LONG 72°25'36-9" LMK GPS: (Unit ID
BANK: TYPE: MATERIAL: SHAPE: Single DIMENSIONS: SUBMERGE [] LT] RT] Head [] Closed [] Concrete [] Metal [] Circular [] Double [] No FLOW: [] Closed [] PVC/Plastic [] Brick [] Elliptical [] Triple [] Diameter: [] No [] Moderate [] Other: [] Other: [] Other: [] Fully
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$
CONDITION: ODOR: IN 00 DEPOSITS/STAINS: VEGGIE DENSITY: PIPE BENTHIC GROWTH: In 000 Indext None Indext None Indext None Indext None Indext None Indext None Indext None Indext None Indext None Indext None Indext None Indext None Indext None Indext None Index None Indext None Indext None
FLOWING ONLY TURBIDITY: None Slight Cloudiness Cloudy Opaque ONLY FLOATABLES: None Sewage (toilet paper, etc.) Petroleum (oil sheen) Other: OTHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Sedimentation CONCERNS: Needs Regular Maintenance Bank Erosion Other: POTENTIAL RESTORATION CANDIDATE Discharge investigation Stream daylighting Local stream repair/outfall stabilizati Image: None Storm water retrofit Other:
If yes for daylighting: Length of vegetative cover from outfall: ft Type of existing vegetation: Slope: If yes for stormwater: Is stormwater currently controlled? Yes No No No No No Type of existing vegetation: Slope: o Area available: Acres
OUTFALL Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream. Small discharge; flow mostly clear and odorless. If the discharge; flow mostly clear and odorless. If the discharge; staining; or appearance of causing any erosion problems
<u>5</u> 4 3 (2) 1 SKETCH/NOTES:
915ter. GIS data shows G-BST in the location of this direct. In wealing, CBST& GB Conflow near other and of GB-01
Reported to Authorities: Yes

					Storm	Water C	Dutfalls	OT
WATERSHED/SUB	SHED: Gan	es Ble	DA	TE: 1_ 1_ 5	108	ASSESS	ED BY:	JHW
SURVEY REACH I	D: 68-01	TIME: 10 : 25 AM/P	м Рн	юто ID: (Cai	mera-Pic #)	· · · · · · · · · · · · · · · · · · ·	/# /	818
SITE ID (Condition-	t): OT-	LAT-1/ º 51 · 20.	1 "Long	720251	37.5"	LMK_		GPS: (Unit ID)
BANK: LT RT He FLOW: None Trice		MATERIAL:]Metal 🔲]Brick 🔲		Double	DIMENSIC		SUBMERGED:
Moderate' Substantial Other:	Dpen channel	Concrete	arthen	Trapezoid Parabolic Other:		n:(n (Top): <u>3</u> ottom):/{		NOT APPEICABLE
CONDITION:	ODOR:	☐None ☐Oily		GGIE DENSIT None Normal Inhibited		Brown Other:	Orange	WTH: Mone e 🔲 Green
Corrosion Other: Vegetated	Sulfide Other:	Paint Other:		Excessive Other:] Good	LITY: []Odors [] Algae [· ·
FLOWING Tu ONLY FLOWING OTHER Image: Concerns:	RBIDITY:	intenance B	ness [C Paper, etc.) Dumping (bul Bank Erosion	loudy		sheen) imentation	C Oth	ler:
If yes for daylightin Length of vegetative	ng:	DATE Discharge in ve		Other:	hting L I	Local stream	m repair/ou	utfall stabilization
If yes for stormwat Is stormwater current Yes No	ly controlled?		Use descript available:	ion:				
OUTFALL SEVERITY: (circle #)	strong smell. The amo	nstream.	discharge has discharge is v flow and any i	ge; flow mostly cle a color and/or ode ery small compare mpact appears to	or, the amount ed to the strean	of n's base	discharge; sta	not have dry weather aining; or appearance y erosion problems.
SKETCH/NOTES:	<u> </u>	5	4	(3)		2		1
	C	ガ-01 マ						
		I 84 Box ca	- Iverts	tan gan yang tang tang tang tang tang tang tang t	_			
					REPC	RTED TO A	UTHORITI	ES: 🗌 YES 🗌 NO

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				S	Severe B	ank Erosic	m ER
WATERSHED/SUBS	SHED: Goges	Brook		DATE: 6 / 5	108	ASSESSED	BY: DOR
SURVEY REACH:	68-01	TIME: 10 :	CO AM/PM	PHOTO ID (CAI	MERA-PIC #	#): /	# 1411 1812
SITE ID: (Condition-	#) START LAT	11 0 51 1245	" LONG 72 º2	5 1322"	LMK	GI	PS: (Unit ID)
ER- <u>01</u>	END LAT	11 0 51 1 23.6	" LONG 72.02	<u>5 '323''</u> 5 '343''	LMK		,
	Currently unknown	BANK OF CO	$\mathbf{D} \mathbf{N} \mathbf{C} \mathbf{E} \mathbf{R} \mathbf{N} \mathbf{C} \mathbf{R} \mathbf{N} \mathbf{R} \mathbf{R} \mathbf{N} \mathbf{R} \mathbf{N} \mathbf{R} \mathbf{R} \mathbf{N} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} R$	RT Both (looking dow	vnstream)	<i>"</i> –
Downcutting	Bed scour	DIMENSIONS		Straight section s light means	Steep s	slope/valley w	all Other:
Widening	Bank failure						11 6-150
Headcutting	Bank scour	Bank Ht		t and/or RT t and/or RT			
Aggrading Sed. deposition	Slope failure	Bank Angle		° and/or RT			
		1					
LAND OWNERSHIP	Private 🗌 Publi		LANDCOVER	: 🛛 Forest	Field/Ag		1:
POTENTIAL RESTO	DRATION CANDIDATI	E: Grade		🗴 Bank stabilizatio	'n		
THREAT TO PROPI	ERTY/INFRASTRUCT	URE: 🔀 No	Yes (Descri	pe):			·
EXISTING RIPARIA	N WIDTH:	≤25 ft	25 - 50 ft	50-75ft75	5-100ft	⊠>100ft	
EROSION	Active downcutting; tall ban of the stream eroding at a f		Pat downcutting evid	ent, active stream	Crode one		
SEVERITY(circle#)	contributing significant amo	unt of sediment to	widening, banks activ moderate rate; no thr		failure/ero	sion; likely cause	olated areas of bank d by a pipe outfall, local
Channelized= 1	stream; obvious threat to pr infrastructure.	operty or	infrastructure	out to property of	scour, imp	aired riparian veç	getation or adjacent use.
}	5 Good access: Open area i		4 3	· · · · · · · · · · · · · · · · · · ·	2	1	
ACCESS:	ownership, sufficient room t materials, easy stream chan heavy equipment using exist trails.	o stockpile nnel access for	Fair access: Foreste adjacent to stream. A removal or impact to Stockpile areas smal	ccess requires tree	other sens stockpile a	itive areas to acc areas available ar rom stream sectic	ss wetland, steep slope or cess stream. Minimal nd/or located a great on. Specialized heavy
	5	4	4 3	(2	1	
NOTES/CROSS SEC	DENSE E AICROACH JWASU	A C	cont	ndercot DEN ENC IM	SE TROAC	tt inc VES	
			and second second second		Reporte	D TO AUTHOR	RITIES 🗌 YES 🗌 NO
antan		,			······································		

					Severe Ba	ank Erosion	ER
WATERSHED/SUBS	SHED: Gogy	Brook		DATE: _6_/_	5108	ASSESSED BY:	DEB
SURVEY REACH:	C-B-01	TIME: <u>10</u> :	O_AM/PM	Рното ID (С	AMERA-PIC #	+): DB(sua(#	1.3
SITE ID: (Condition-	#) START LAT	11 . 51 . 22.2	" LONG <u>72</u> °2	5 .31.2."	LMK	GPS: (1	
ER- <u>0</u> 1	END LAT		" LONG°	1 11	LMK		
 Downcutting Widening Headcutting Aggrading Sed. deposition 	Currently unknown Bed scour Bank failure Slope failure Channelized Private Public	LOCATION: DIMENSIONS Length (if no o Bank Ht Bank Angle	GPS) LTf LTf LT	Straight section t and/or RT t and/or RT	on □ Steep s	lope/valley wall [Bottom width	/ <u>0</u> ft _5_ft
POTENTIAL RESTO	DRATION CANDIDATE	C: Grade	7	🗶 Bank stabilizat	tion	1997 (1997) 	
THREAT TO PROP	ERTY/INFRASTRUCT	URE: 🔀 No	Yes (Descrit	pe):		<u> </u>	
EXISTING RIPARIA	N WIDTH:	□ ≤25 ft	25 - 50 ft] 50-75ft □	75-100ft [∑ >100ft	
EROSION SEVERITY(circle#) Channelized= 1	Active downcutting; tall ban of the stream eroding at a fa contributing significant amo stream; obvious threat to pr infrastructure.	ast rate; erosion unt of sediment to	Pat downcutting evide widening, banks activ moderate rate; no thr infrastructure	ely eroding at a	failure/eros	width stable; isolated a sion; likely caused by a aired riparian vegetatior	pipe outfall, local
ACCESS:	5 Good access: Open area in ownership, sufficient room t materials, easy stream char heavy equipment using exis trails.	n public o stockpile anel access for	4 3 Fair access: Foreste adjacent to stream. A removal or impact to Stockpile areas small	ccess requires tree andscaped areas.	other sensi stockpile a	1 ccess. Must cross wetla tive areas to access str reas available and/or lo om stream section. Spe required.	eam. Minimal cated a great
	5		4 3		2)	1	
NOTES/CROSS SEC		to 8	evosion	ndereut			
)					Reportei	D TO AUTHORITIES	Yes No

			R	Reach Level As	ssessment	RCH
SURVEY REACH I	D: <u>GB-OZ</u> WT	rshd/Subshd: G-	ates Bucole	DATE: 6/ 3	10244	SSED BY: = M(A(L))
START TIMI LAT 41 ° 51 '2 DESCRIPTION: 4	E: 10: <u>30</u> AM/PM 2 <u>6-1</u> " LONG 7 0077 RIDC- 1	LMK: Z° <u>Z5 'Z9.4</u> "	END TIME:_ LAT_41° 57 ' DESCRIPTION: BAT		LMK: 2°_25 '24	GPS ID:
RAIN IN LAST 24 HO	URS 🗆 Heavy rain	□ Steady rain □ Trace	PRESENT CONDITIONS	G □ Heavy rain □ Trace	□ Steady rain □ Overcast	□ Intermittent □ Partly cloudy
SURROUNDING LANE	DUSE: Industrial Golf cour		□ Urban/Residential □ Crop			□ Institutional
AVERAGE	CONDITIONS (chec	ck applicable)	REACH	SKETCH AND SI		
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	∑ 50%-75% □ 75-100%	within the survey re	of survey reach. Tra each (OT, ER, IB,SC, deemed appropriate.	UT, TR, MI) as we	Ds for all site impacts ell as any additional
DOMINANT SUBSTRA	slick) 🗆 Co	lozele w Some PLACES bbble (2.5 –10") pulder (>10") d rock	A Starb BAE	Brouad	. indicate direction	1 0 <i>j ji</i> 0w
WATER CLARITY	aturally colored)		q's e	CUEOFEP		
AQUATIC PLANTS IN STREAM		e \Box some \blacksquare lots	JE-OL			
WILDLIFE IN OR AROUND STREAM	(Evidence of) Fish Beave Snails Other	er 🔣 Deer	DETR			
STREAM SHADING (water surface)	Mostly shaded (☐ Halfway (≥50% ☐ Partially shaded ☐ Unshaded (< 25) (≥25%)	SANDA	WETLAND		
CHANNEL DYNAMICS	 Downcutting Widening Headcutting Aggrading Sed. deposition 	Bed scour Bank failure Bank scour Slope failure Channelized	SAND SICT	UERAND)		FRANCE
CHANNEL DIMENSIONS	Height: LT bank RT bank	$\frac{1}{2} \frac{1}{2} \frac{1}$	UERLAND STORE	BANK ~ I'H		T
(Facing downstreaM)	Width: Bottom Top	(ft) (ft)	Currante L	wild wrote	ס	DERNALLY
R	EACH ACCESSIBILIT			R/P	Lan official states	SUBSTRATE
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using	Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.	Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.	WOUDED GROSS Stress Sitr could bottern 4"	ie iw -> kut	NP A190 NP Son Son Son Son Son Son Son Son Son Son	for 14
NOTES: (biggest probl	lem you see in survex r	reach)				
1			-	-		
				REPOR	TED TO AUTHOR	ITIES YES NO

N. 7. *. . .

	Optimal	Suboptimal	Marginal	Poor		
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.		
	20 19 18 17 16	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0		
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.		
	Left Bank 10 (5)	8 7 6	5 4 3	2 1 0		
	Right Bank 10 0	8 7 6	5 4 3	2 1 0		
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.		
	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
	Over	ALL BUFFER AND FLOODPLA	IN CONDITION			
	Optimal	Suboptimal	Marginal	Poor		
Vegetated Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.		
	Left Bank (10) 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0		
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land		
	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0		
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water		
	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
Floodplain Encroach-	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on		
MENT	20 (19) 18 17 16	15 14 13 12 11	effect on floodplain function	floodplain function 5 4 3 2 1 0		

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Trash and Debris

WATERSHED/SUB	SHED: GAGES TS	Rook	DATE: $\underline{6} / \underline{3} / \underline{0} \underline{4}$ Assessed by: $\overline{D} \mathbb{R} \overline{J}$			
JURVEY REACH I	D: 68-02	TIME: 11: / (_AM/PM	Рното ID: (Ca	mera-Pic #)	1# 1708	
SITE ID: (Condition	+#) TR- <u>01</u> Lat <u></u>	<u>[° 51 ' 24,5</u> " Long	12 . 25 . 27	<u><u> </u></u>	GPS: (Unit ID)	
TYPE: Industrial Commercial Residential		nstruction Metal Medical rd Waste	SOURCE: Unknown Flooding Ullegal dump Local outfall	LOCATION: Stream Riparian Area Lt bank Rt bank	LAND OWNERSHIP: Public Unknown Private AMOUNT (# Pickup truck loads): 1 (cod c)	
POTENTIAL REST	ORATION CANDIDATE		/	_	vention of dumping	
If yes for trash or debris removal		Heavy equipment		wn	DUMPSTER WITHIN 100 FT:	
CLEAN-UP POTENTIAL: (Circle #)	A small amount of trash (i.e., k than two pickup truck loads) loca inside a park with easy access		ay have been dumped ov t could be cleaned up ir	ver area, where acce	of trash or debris scattered over a large ess is very difficult. Or presence of drums hazardous materials	
NOTES:	(5)	4	3	2		
<u>}</u>				REPORTED	TO AUTHORITIES 🗌 YES 🕅 NO	

TR

			-			RCH
			Ke	ach Level As	sessment	MUII
SURVEY REACH I	D:65-03 W	rrshd/Subshd: Gas	105	DATE: <u>6/3</u>	_/ Asses	SED BY:
	E: 12: 18 AM/PN		END TIME:	1: 22 AM/PM	LMK:	GPS ID:
	<u>37.9</u> " Long <u>7</u>		LAT <u>4(° 5 (' 4</u> DESCRIPTION: Description:		5° <u>15'12.</u>	<u></u>
	AZB WIZE	TENLE		A Douge	-CONVOT	
RAIN IN LAST 24 HO			PRESENT CONDITIONS	□ Heavy rain □ Trace	□ Steady rain □ Overcast	 Intermittent Partly cloudy
SURROUNDING LAN	□ Golf cou	rse 🗆 Park	□ Urban/Residential □ □ Crop □	□ Suburban/Res □ Pasture	☑ Forested ☑ Other: 015	Institutional Fパシンク
	CONDITIONS (che			KETCH AND SIT		
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	□ 50%-75% ∡X 75-100%	Simple planar sketch og within the survey read	ch (OT, ER, IB,SC,	UT, TR, MI) as we	ll as any additional
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5) WATER CLARITY	slick) $\Box \vec{C}$ $\Box B$ $(\Box) D$) & (2.5 – 10") oulder (>10") ed rock	Secures a	leemed appropriate.	inaicale airection	of flow
□ Stained (clear, n □ Other (chemicals,	aturally colored)		Jun Junio			
AQUATIC PLANTS IN STREAM			to ball Kar Fran	enotional particul		
STREAM SHADING (water surface)	□ Snails □ Othe ▲ Mostly shaded □ Halfway (≥50% □ Partially shaded □ Unshaded (< 250%)	(≥75% coverage) b) l (≥25%)	the son service			
CHANNEL DYNAMICS	Downcutting Widening Headcutting Aggrading Sed. deposition	Bed scour Bank failure Bank scour Slope failure Channelized	E melt Est	₽- k		
CHANNEL DIMENSIONS (FACING DOWNSTREAM)	Height: LT bank RT bank Width: Bottom Top	2.75 (ft) 2.0 (ft) 36-9 (ft) 11 (ft)	del tal	× × V		- A - 14
R	EACH ACCESSIBILI	FY		K with		
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.	Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.	Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/or located a great distance from stream. Specialized heavy	and a set work			
5 (4	3	equipment required.	x x x 2X			-
NOTES: (biggest prob	lem you see in survey	reach)	Barbez	2 V ** 5~		3000 × 1
/				. ~~	ena 1 1	~
				Report	TED TO AUTHORI	
						·····

	Optimal	Suboptimal	Marginal	Poor	
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lac of habitat is obvious; substrate unstable or lacking.	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
	Left Bank 10 9	8 7 6	<u>5</u> 4 3	2 1 0	
	Right Bank 10 9	8 7 6	<u>5</u> 4 3	2 1 0	
BANKBanks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems downstream)		Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding at a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
	Over	ALL BUFFER AND FLOODPLA	IN CONDITION		
	Optimal	Suboptimal	Marginal	Poor	
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet, human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetatior type is turf or crop land	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function	
	20 19 18 (17)16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	

					Severe B	Bank Er	osion	ER
WATERSHED/SUBS	HED: Gages			DATE: <u>6</u> /	3108	ASSES	SED BY:	
SURVEY REACH:	a	TIME: <u>/2</u> :	30 AM/PM	Рното ID ((CAMERA-PIC	#): 17/	// /#	
SITE ID: (Condition-		0 1	" LONG°	· · · · · · · · · · · · · · · · · · ·			GPS: (U	Jnit ID)
<u>er01</u>	END LAT			t t!			Ì	
 Downcutting Widening Headcutting Aggrading Sed. deposition 	Currently unknown Bed scour Bank failure Bank scour Slope failure Channelized Private Public	LOCATION: DIMENSIONS Length (if no C Bank Ht Bank Angle	<i>GPS</i>) LTf LTf LT	X Straight secti t and/or RT t and/or RT ° and/or RT	tion \Box Steep <u>100</u> ft <u>3</u> ft <u>60</u> °	slope/vall Botto Top v Wette	ey wall [m width _ vidth ed Width	ft ft
□ No	DRATION CANDIDATE	Other		Bank stabiliza	ation			
EXISTING RIPARIA		_	□ 25 - 50 ft [·	75-100ft	X >1001	ft	
EROSION SEVERITY(circle#) Channelized= 1	Active downcutting; tall ban of the stream eroding at a fa contributing significant amou stream; obvious threat to pri infrastructure.	ast rate; erosion unt of sediment to	Pat downcutting evide widening, banks activ moderate rate; no thr infrastructure	ely eroding at a	failure/er	osion; likely o		reas of bank bipe outfall, local l or adjacent use.
ACCESS:	5 Good access: Open area in ownership, sufficient room t materials, easy stream char heavy equipment using exis trails.	n public o stockpile nnel access for ting roads or	4 3 Fair access: Foreste adjacent to stream. A removal or impact to Stockpile areas small	ccess requires tree andscaped areas.	other ser stockpile distance	nsitive areas areas availa	to access stro ble and/or loo	nd, steep slope or eam. Minimal cated a great ccialized heavy
	5	(4	3		2		1	
NOTES/CROSS SEC	HON SKEICH.							
.)					Report	ED TO AUI	HORITIES	🗌 Yes 🗌 No

Storm Water Outfalls

WATERSHED/SUBSH	IED: Goges		DATE: <u>6 / 3 / 05</u>	ASSESSED BY:	
SURVEY REACH ID:	63.03 R 1	'IME: <u>12:55</u> AM/PM	Рното ID: (Camera-Pi	c#) Canon 1#	1715
SITE ID (Condition-#):	OT 1	AT' I	20NG ''	LMK	GPS: (Unit ID)
					I
BANK:	TYPE:	MATERIAL:	SHAPE: Single	DIMENSIONS:	SUBMERGED:
LT KT Head	Closed	Concrete Metal		Diamotor: (ii	□ No
FLOW: None Trickl		Other:	Elliptical Triple	Diameter: <u>(ir</u>	
Moderate		NO PPE VISIBLE			Fully
Substantial	X Open	Concrete Earther	Parabolic Jus W		
Other:	channel	Dither: Ripzap		(Bottom): <u>30</u>	
CONDITION:	ODOR: 🗌 NO	DEPOSITS/STAINS:			
□ None		None	VEGGIE DENSITY:	PIPE BENTHIC GR	
Chip/Cracked	Sewage	Oily	Normal	Other:	
Peeling Paint Corrosion	Rancid/Sour	Flow Line	Inhibited	POOL QUALITY:	No pool
Other: Verelation	Sulfide	Other:	Excessive	Good Odors	
<u> </u>				Suds Algae	☐ Floatables
	L				
FOR COLO				Orange 🗌 Red 🗌 (Other:
A	BIDITY: No	<u> </u>	Cloudy Opaque		
	TABLES: 🔽 No xcess Trash (paper/p				Other:
	eeds Regular Mainte			deter in ru	ORAT
)		·····			<u>.</u>
POTENTIAL RESTOR	RATION CANDIDAT	TE 🔲 Discharge investigati	on 🗌 Stream daylighting	Local stream repair	/outfall stabilization
no		Storm water retrofit	on Stream daylighting Stream daylighting	Condroll?	
If yes for daylighting	· ·				
Length of vegetative co	over from outfall:	ft Type of exi	sting vegetation:	Slope:	o
If yes for stormwater					
Is stormwater currently	controlled?	Land Use d	escription:		
Yes No N	ot investigated	Area availal	ple:		-
	leavy discharge with a di	stinct color and/or a Small of discharge is significant	discharge; flow mostly clear and od	orless. If the	
(aivala #)	compared to the amount of	of normal flow in receiving	arge has a color and/or odor, the am arge is very small compared to the st	Unit of discharges	es not have dry weather staining; or appearance
	stream; discharge appear significant impact downsti	sto be naving a flow a	nd any impact appears to be minor /	of counting	any erosion problems.
	5	4	3	2	1
SKETCH/NOTES:					
)					
)			R	EPORTED TO AUTHOR	ITIES: UYES NO

					Stre	am Cros	ising SC	
WATERSHED	SUBSHED: Acres		DA	ате: <u>6</u>	13108	ASSE	SSED BY: Eam	
URVEY REA	сн ID: GBO3A	TIME: 1 : 05	AM/PM PH	юто ID	: (Camera-Pie	c #)	/#	
SITE ID: (Con	dition-#) SC LAT	410 51 137	<u>]</u> " LONG <u>15</u> °	25	<u>17.9</u> " L	мк	GPS (Unit ID)	
		···· ··· ·····························						
TYPE: Roz	d Crossing 🗌 Railroad Cross		Dam 🗌 Beaver D	am 🗌	Geological For	nation 🗌	Other:	
For Road/ Railroad	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS: Single Double Triple Other:	MATERIAL: Concrete Metal Other:	Flc	NMENT: ow-aligned t flow-aligned not know	Barrel dia	Height: 49 (ft)	
CROSSINGS ONLY	CONDITION: (Evidence of)	on 🗌 Downstream		🗹 Fla	TERT SLOPE: tt ght $(2^{\circ} - 5^{\circ})$	Culvert le	Width: $\underline{7}$ (ft)	
	Other (<i>describe</i>): rush				vious (>5°)	Roadway	elevation:_ <u>14</u> (ft)	
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re	emoval 🗌 Culvert repair 📝 Other: į		placement 🔲 depth <u>fyrt f</u>		torage retrofit	
IS SC ACTING	G AS GRADE CONTROL		es 🗌 Unknow	/n (2	1 0 0			
	EXTENT OF PHYSICAL BL			BLO	CKAGE SEVE	RITY: (circ	le #)	
If yes for fish barrier	□ Total □ Partial □ Temporary □ Unknown CAUSE: □ Drop too high Water Drop: (in) ☑ Flow too shallow Water Depth: 1.5 (in)		A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.	
<u>)</u>	Other:		5		4 3		(2) 1	
NOTES/SKET	CH:				Repor	TED TO AU	THORITIES 🗌 YES 🗌 NO	

			Re	each Level As	ssessment	RC
SURVEY REACH	ID: <u>63-05</u> 3 WTR	SHD/SUBSHD: Guy	es Bb	Date: <u>6 / 3</u>		CSSED BY: DB JW SN
LAT 41 . 51 .	1E: <u>3 : 1 3</u> AM/PM 32.7" LONG <u>7</u> 5C -01 (GR-03A	LMK: 2° 25 '17.9 "	END TIME: 4	: <u>26</u> AM/PM 37.5" LONG <u>7.</u> -0.7. (GB -	LMK: 2 • 25 • 14	G
None	DURS Heavy rain Intermittent	□ Steady rain □ Trace	PRESENT CONDITIONS	□ Heavy rain □ Trace	✓ □ Steady rain □ Overcast	ı □ Intermitte □ Partly cl
SURROUNDING LAP	DUSE: MIndustrial	Commercial e 🗆 Park		□ Suburban/Res □ Pasture	□ Forested □ Other:	□ Institutio
AVERAG	E CONDITIONS (check	applicable)	REACH S	SKETCH AND SI	FE IMPACT TR	ACKING
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	□ 50%-75% ♀ 75-100%	Simple planar sketch o within the survey rea features o		UT, TR, MI) as we	ell as any addii
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2)	slick) 🗹 Cob	ble (2.5 –10") Ilder (>10") rock		Induistrial	واللوم الرضوي المريب المرضان مراكب المراجع والمروي	
AQUATIC PLANTS IN STREAM	Attached: □ none Floating: ☑ none					
Wildlife in or Around Stream	(Evidence of) ☑ Fish □ Beaver □ Snails □ Other:		- party			
STREAM SHADING (water surface)	Ŵostly shaded (≥ □ Halfway (≥50%) □ Partially shaded (□ Unshaded (<25%	≥25%)	uin a booting draws	0732		
CHANNEL DYNAMICS	Downcutting Widening Headcutting	Bed scour Bank failure Bank scour	baor of wall		La construcción de la casa de la construcción de la construcción de la construcción de la construcción de la co	
Unknown	Aggrading Sed. deposition	Slope failure			in data windu takan da	
CHANNEL DIMENSIONS	Height: LT bank RT bank	$\frac{2.5}{1.5}$ (ft)		ALLES AND ALL ALL ALL ALL ALL ALL ALL ALL ALL AL		
(Facing downstreaM)	Width: Bottom Top	(ft)	TT .		2	
1	REACH ACCESSIBILITY			5 H T	Ĥ	
Good: Open area in public ownership, sufficient room to stockpile materials,	developed area v adjacent to stream. s	Difficult. Must cross vetland, steep slope, or sensitive areas to get to stream. Few areas to				
easy stream channel access for heavy equipment using existing roads or trails.	landscaped areas. a Stockpile areas c small or distant from S	tockpile available Ind/or located a great listance from stream. Specialized heavy	G	erber Rd		
5 1	3 2	equipment required.				
NOTES: (biggest pro	őlem you see in survey re		uffer + trash			

	Optimal	Suboptimal	Marginal	Poor		
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.		
	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 77 6	5 4 3	2 1 0		
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
	Over	ALL BUFFER AND FLOODPLA	IN CONDITION			
·····	Optimal	Suboptimal	Marginal	Poor		
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.		
	Left Bank 10 9	8 7 6	3 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 (4) 3	2 1 0		
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land		
	20 19 18 17 16	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0		
FLOODPLAIN Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		

SURVEY REACH D: C# 038 TIME: 2 - 1/2 AM(20) PHOTO D: (Canara-Pric ft) Iff 172 - 4 STIE D: (Combine #): OT-02 LAT N 0 - 51 - 51.4 "LONG 72 - 25 - 1/2-1 "LMK CR5: (Unit D) BANK: Charles 1 - 51.4 "LONG 72 - 25 - 1/2-1 "LMK CR5: (Unit D) BANK: Charles 1 - 51.4 "LONG 72 - 25 - 1/2-1 "LMK CR5: (Unit D) BANK: Charles 1 - 51.4 "LONG 72 - 25 - 1/2-1 "LMK CR5: (Unit D) BANK: Crossed DVCPIsatic Binds Dimensions: No BUBERGED: BANK: Crossed DVCPIsatic Binds Timpezoid Dept: (unit D) North Partially Modernic Concerve Earthen Crossed Dimensions: North Concerve Earthen Partially Timpezoid North Concerve Earthen	WATERSHED/SUBSHED: / TOTALS B) DATE: 6/3/08 ASSESSED BY: TOTALS									
STIE ID (Cauditanne): OT-OZ LAT 'A' o 'S 1 ' St.A " LONG 'L' o 'S 1 ' L' A'' LONG 'L' o 'S 1 ' St.A " L' O' L' o 'S 1 ' S 1 ' A' ' S '										
BANK: TYPE: MATERIAL: SHAPE: Single DIMENSIONS: SUBMERGED: BLT_RT_HEad Closed PVCPlatic Bitk Elliptical Triple Dimeter(h) No Mone Trickle Other: Other: Other: Other: Other: No Parabolic With (Top): Single Other: No No Parabolic With (Top): Single No N		N. STATUTE AND								
BANK: MLT_RT_Head FLOW: Prot: None TYPE: Concrete MATERIAL: MATER	SILE ID (Condition-#): 01- <u>0</u> LA	T <u>410 31 / 51.0</u>	"LONG <u>72° 27 ' 16</u> *						
□ Orderate □ Orgen □ Concrete □ Earthen □ Trapezoid □ Depth: '(in) Not stress (in) Not stre	LT RT Hea	d Closed	Concrete	Aetal Circular Dou Brick Elliptical Tripl	e DIMENSIONS: ble	SUBMERGED:				
Mone Gas None None None Brown: Orange Green Chip/Cracked Sexwage Oily Diffie Oily Diffie Other: Brown: Orange Green Other: Sulfide Other: Brown: Orange Green Other: Other: DoL QUALITY: No pool Other: Other: Brown: Orange Red Other:	Substantial		Other:	Parabolic	Width (Top): <u>5 (in)</u>					
PLOWING ONLY TURBDITY: Nonc Slight Cloudiness Cloudy Opaque ONLY FLOATABLES: None Sewage (toilet paper, etc.) Petroleum (oil sheen) Other: OTHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Sedimentation Other: OTHER Needs Regular Maintenance Bank Erosion Other: POTENTIAL RESTORATION CANDIDATE Discharge investigation Stream daylighting Local stream repair/outfall stabilization If yes for daylighting: Length of vegetative cover from outfall: ft Type of existing vegetation: Slope: ° If yes for stormwater: Is stormwater currently controlled? Land Use description: INDUSTRIAL DARKING LOT Outfall does not have dy weather discharge shale as a color and/or dor, the amount of momal flow in receiving stream, discharge appears to be having a significant compared to the amount of momal flow in receiving stream, discharge appears to be having a significant may a significant ma	None Chip/Cracked Peeling Paint Corrosion	Gas Sewage Rancid/Sour Sulfide	 None Oily Flow Line Paint ☑Other: 𝒴𝟧𝑘𝑘𝑘 	 □ None ⊠ Normal □ Inhibited □ Excessive □ Other: 	Brown Orang Other: POOL QUALITY:	e Green No pool Colors Oils				
Length of vegetative cover from outfall: ft Type of existing vegetation: Slope: o If yes for stormwater: Is stormwater currently controlled? Land Use description: NDVSTRIAL DARKWH fort Yes [A to [X] Not investigated Area available:	FLOWING ONLY TUR FLO OTHER Image: Concerns: CONCERNS: Image: Concerns: POTENTIAL RESTOR Image: Concerns:	FLOWING TURBIDITY: None Slight Cloudiness Cloudy Opaque ONLY FLOATABLES: None Sewage (toilet paper, etc.) Petroleum (oil sheen) Other: OTHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Sedimentation CONCERNS: Needs Regular Maintenance Bank Erosion Other: POTENTIAL RESTORATION CANDIDATE Discharge investigation Stream daylighting Local stream repair/outfall stabilization								
OUTFALL SEVERITY: (circle #) Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream, discharge appears to be having a significant impact downstream. Small discharge; flow mostly clear and odorless. If the discharge has a color and/or odor, the amount of discharge is very small compared to the stream's base flow and any impact appears to be minor / localized. Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems. 5 4 3 1 SKETCH/NOTES:	Length of vegetative of If yes for stormwate Is stormwater current	cover from outfall: er: ly controlled?	Land U	lse description: INDUST	A					
SKETCH/NOTES:	SEVERITY:	strong smell. The amount of compared to the amount of stream; discharge appears to significant impact downstreat	inct color and/or a f discharge is significant normal flow in receiving to be having a am.	Small discharge; flow mostly clear an discharge has a color and/or odor, the discharge is very small compared to t flow and any impact appears to be mi	e amount of he stream's base nor / localized.	aining; or appearance ny erosion problems.				
V OF 3 V OF 3	SKETCH/NOTES	3	4	3		1				
	L OF 3 									

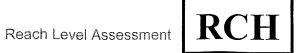
F			Sto	orm Water O	utfalls	UI			
WATERSHED/SUBSHE	D: Grages	BL	DATE: 61310	DATE: 613106 ASSESSED BY: DES					
SURVEY REACH ID:	(-3-033 TI	ме: <u>3</u> : <u>25</u> ам/рм	Рното ID: (Camera-I	Pic#)DR (BUDV		22			
SITE ID (Condition-#):	DT- <u>01</u> LA	<u>итијо 57 · 37.1</u>	"LONG 72 ° 25 ' 17.3	_" LMK	GI	PS: (Unit ID)			
BANK: LT RT Head FLOW: None Trickle Moderate	TYPE:	MATERIAL: Concrete Ma PVC/Plastic Br. Other:				SUBMERGED:			
☐ Substantial	Open channel	Concrete Earth		Depth: Width (Top): " (Bottom):	<u></u>	NOT APPECABLE			
CONDITION: Chip/Cracked Peeling Paint Corrosion Other:	ODOR: ⊠ NO ☐ Gas ☐ Sewage ☐ Rancid/Sour ☐ Sulfide ☐ Other:	DEPOSITS/STAINS: None Oily Flow Line Paint Other:	VEGGIE DENSITY: None Normal Inhibited Excessive Other:		☐ Orange <u>MOGS</u> ITY: ☐ 1 Ddors ☐ C	Green No pool Colors □Oils			
OTHER Exc	DITY: Non ABLES: Non cess Trash (paper/pla eds Regular Mainter	e Slight Cloudiness e Sewage (toilet pap astic bags) Dum nance Bank	Cloudy Opaque	e Sedimentation	Othe	r:			
no If yes for daylighting:		Storm water retrofi							
Length of vegetative cov	ver from outfall:	ft Type of	existing vegetation:		Slope:	o			
If yes for stormwater: Is stormwater currently of Yes No (No	controlled? t investigated	Land Use Area ava	e description: <u>Juduetnia</u> ilable:	1 parking	101				
SEVERITY: co (circle #) str	eavy discharge with a dist ong smell. The amount of mpared to the amount of eam; discharge appears inificant impact downstre	f discharge is significant normal flow in receiving to be having a	nall discharge; flow mostly clear and scharge has a color and/or odor, the a scharge is very small compared to the w and any impact appears to be minor 3	mount of dis	scharge; stain	have dry weather ing; or appearance erosion problems.			
SKETCH/NOTES:					<u></u>	I			
	Pa. Th	ELINE ELINESS BAT	or you	J.+	T	-			
)				REPORTED TO AU	THORITIES	5: 🗌 YES 🔺 NO			

Storm Water Outfalls							
WATERSHED/SUBS	HED:		DATE: 6	3 1 08	ASSESSED BY:	Team	
SURVEY REACH II	: GB-36	TIME: 3 : 40 AM/P	м) Рното ID: (Camera-Pic #)	1725 /#	·ca m	
SITE ID (Condition-#	0T- <u>3</u>	LAT <u>41° 51 ' 3</u>	52" LONG 72° 25	· 16.3 "	LMK	GPS: (Unit ID)	
BANK: LT RT Hea FLOW: Mone Trick Moderate	Closed	MATERIAL: Concrete PVC/Plastic Other:	Metal 🗌 Circular	Double	IMENSIONS: iameter: <u>24 (in</u>)	SUBMERGED:	
Substantial	Open channel	Concrete E	Earthen Trapezoid		(Top): <u>(in)</u> (tom): <u>(in)</u>	NOT APPESCABLE	
CONDITION: None Chip/Cracked Peeling Paint	ODOR: Gas	☐ None ☐Oily	☐ None ☑ Normal		Other:	ge 🗌 Green	
Corrosion	Sulfide	Paint	☐ Inhibited ☐ Excessive ☐ Other:		POOL QUALITY: No pool Good Odors Colors Suds Algae Floatables Other: Other: Double		
ONLY FLO OTHER	BIDITY:	-	ness Cloudy paper, etc.)			ther:	
no no		ATE Discharge inve		/lighting 🗌 Lo	ocal stream repair/	outfall stabilization	
If yes for daylighting Length of vegetative of	*	ft Type	of existing vegetation:_		Slope:	0	
If yes for stormwate Is stormwater current	y controlled? Not investigated	Area	Use description: available:				
OUTFALL SEVERITY: (circle #)	(circle #) compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream.		Small discharge; flow most discharge has a color and/o discharge is very small com flow and any impact appear 4 3	r odor, the amount or pared to the stream's	f discharge; s	es not have dry weather staining; or appearance any erosion problems.	
SKETCH/NOTES:					£	1	
		3084 +	Jaced and				
)		and a second		Repor	RTED TO AUTHORI	fies: 🗌 yes 🗌 no	

					Impac	ted But	ffer	IB
WATERSHED/SUBSHED: (-	Jack S Br	sole		DATE:	61310	8 Ass	ESSED E	IY: DRB
URVEY REACH: OB - C	()	TIME: Š	: 15 AM/PM		D ID: (Camera-l			
SITE ID: (Condition-#) START			LONG °	········				(Unit ID)
B- <u>O1</u> END	LAT °		LONG °	1 11				GAEVIN
		1					015	shevin
IMPACTED BANK: REAST LT RT Both	ON INADEQUATE:				Widespread i			BRNIC
LAND USE: Priva	te Institutional	Golf Cou	rse Park	Other Publ	ic J			
					: I NOVSTIEL			
RT Bank					: INDUSTRU	16		
	aved Bare ground	d Turf/lav	vn Tall gra			Other	چوند میں	. 7
•							ZIPZ	
				\$				ing wall
INVASIVE PLANTS:	None 🗌 Rare	<u>ы</u> Б	artial coverage		tensive coverage	unki	nown	
STREAM SHADE PROVIDED? [None Part	ial 💢	Full WE	TLANDS PF	RESENT? No	X Yo	es 🗌 U	Jnknown
POTENTIAL RESTORATION CAN			on Greenwa RETURT A] Natural regener	ation 🔽	Invasive	es removal
RESTORABLE AREALTBANKRTLength (ft): $\sqrt{400}^{-4}$ $\sqrt{100}^{-4}$	REFOREST	ATION	Impacted area or where the riparia not appear to be specific purpose, area available fo	n public land n area does used for any plenty of	Impacted area on ei public or private land presently used for a purpose; available a planting adequate	d that is specific rea for	land wher encroach feature sig	area on private e road; building ment or other gnificantly limits area for planting
Width (ft): <u>~20</u> 10-15			5		1 3	(2)	1
POTENTIAL CONFLICTS WITH F		Wi over 🗌 Sev	despread invas vere animal imp	ve plants acts (deer, b	Potential conta peaver) Other	amination 	La	ick of sun
NOTES:	YP. SICTION	WA	n z	17		(facing	s U/s	;)
			λ					
)								

					Stre	am Cros	ising SC
WATERSHED	/SUBSHED:			DATE: 6	13108	ASSE	SSED BY: Jean
JURVEY REA	сн ID: 68-36	TIME: <u>3:5</u>	<u>3</u> am/pm	Рното П	D: (Camera-Pi	c#) 17:	
SITE ID: (Con	dition-#) SC LAT	410 51 : 37	<u></u> " Long <u>7</u>	2.25	<u>145</u> " L	МК	GPS (Unit ID)
TYPE: MRoa		ng 🗌 Manmade I	1		Geological For		
For Road/ Railroad	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS:	MATERIAL:	Fl	ENMENT: ow-aligned ot flow-aligned o not know	w-aligned Barrel diameter: t flow-aligned Height: not know	
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Downstream scour hole Sediment deposition Failing embankment				VERT SLOPE:Culvert length:lat $Width:$ light $(2^{\circ} - 5^{\circ})$ Obvious (>5^{\circ})Roadway elevation:		Width: <u>64</u> (ft)
	Other (describe): lining of bottom, from r				Roadwa		elevation:) (ft)
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re			eplacement	Upstream st	orage retrofit
IS SC ACTIN	G AS GRADE CONTROL		·				
	EXTENT OF PHYSICAL BLC				OCKAGE SEVE	RITY: (circ	le #)
If yes for fish barrier	☐ Total ☐ Temporary ☐ Unkno CAUSE: ☐ Drop too high Water D ☐ Flow too shallow Water D ☐ Other:	rop: (in)	A structure such a road culvert on a greater stream blo upstream movem anadromous fish; passage device p	3rd order or ocking the ent of no fish	A total fish blocks tributary that wou significant reach or partial blockag interfere with the anadromous fish	Id isolate a of stream, ie that may migration of	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.
Norre/Surr			5	<u></u>	<u>4</u> (3 ¹)		2 1
NOTES/SKET	С H :				noprovenence hop is defe	nmed	· · · · · · · · · · · · · · · · · · ·

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SURVEY REACH]	D: <u>GB-4</u> w	rshd/Subshd: G	ages Brooke	DATE: 6 14	14%	essed by: Team
Start Tim	E: 7 : 10 AM/PN	1 LMK:	END TIME:	7:45 AM/PM	LMK:	GPS ID:
LAT41 0 5.5 1	5%9 " LONG Z	2 . 20 1489"	LAT YN ° SI '	43.8" LONG 7	202511	. in 11
DESCRIPTION:			DESCRIPTION:			
				hor 1738		
RAIN IN LAST 24 HO	URS 🗆 Heavy rain	□ Steady rain	PRESENT CONDITIONS	G 🗆 Heavy rain	Steady rair	Intermittent
□ None	⊡ Intermitten		□ Clear		□ Overcast	\Box Partly cloudy
SURROUNDING LAN			Urban/Residential	□ Suburban/Res	□ Forested	□ Institutional
		rse 🗆 Park	Crop	Pasture	Other:	
	CONDITIONS (che			SKETCH AND SIT		
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	□ 50%-75% □ 75-100%	within the survey re	of survey reach. Tra each (OT, ER, IB,SC, deemed appropriate.	UT, TR, MI) as w	
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5	slick) \Box C \Box B	obble (2.5 –10") oulder (>10") ed rock	_			
WATER CLARITY	aturally colored) 🛛				ya mana mana na	
AQUATIC PLANTS IN STREAM	1	e 🗆 some 🗆 lots	In	dustrial we	st	
IN STREAM		\square some \square lots	. 015	MAN		
WILDLIFE IN OR AROUND STREAM	(Evidence of) Ø-Fish □ Beav □ Snails ⊠ Othe	er Deer :: racoon song bird				
STREAM SHADING (water surface)	DMM ostly shaded □ Halfway (≥50% □ Partially shaded □ Unshaded (< 25	‰) d (≥25%)	ots addall			
CHANNEL	Downcutting	Bed scour	072-			
DYNAMICS	U Widening	🔲 🔲 Bank failure	large	0		
Unknown	Headcutting Aggrading Sed. deposition	Bank scour Slope failure	boulders 19 sediment	3.		
	Height: LT bank	2(ft)	aggredentionst			
CHANNEL DIMENSIONS	RT bank	(ft)				
(FACING	Width: Bottom	(ft)	faller]	:		
DOWNSTREAM)	Тор	$\frac{18}{18}$ (ft)	free 1			
R	EACH ACCESSIBILI					
Good: Open area in	Fair: Forested or	Difficult. Must cross	- /~~	baarori		
public ownership,	developed area	wetland, steep slope, or	. · · · ·	au	and a second	
sufficient room to	adjacent to stream. Access requires tree	sensitive areas to get to	at the second	istrial East		
stockpile materials,	removal or impact to	stream. Few areas to stockpile available	Inde	which cast		
easy stream channel	landscaped areas.	and/or located a great	A State Sta	- Northerstein and Annal An		
access for heavy equipment using	Stockpile areas	distance from stream.				
existing roads or trails.	small or distant from	Specialized heavy				
5 4	stream.	equipment required.				
NOTES: (biggest prob		reach)	J			
						 ,
				KEPOR	FED TO AUTHO	RITIES YES NO

	Optimal	Suboptimal	Marginal	Poor	
IN-STREAM Habitat	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of	20-40% mix of stable habitat; habitat availability less than	Less than 20% stable habitat; lac of habitat is obvious; substrate unstable or lacking.	
(May modify criteria based on appropriate	logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags	populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may	desirable; substrate frequently disturbed or removed.		
habitat regime)	that are <u>not</u> new fall and <u>not</u> transient).	rate at high end of scale).	10 9 8 7 6		
VEGETATIVE PROTECTION	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of	Less than 50% of the streamban surfaces covered by vegetation; disruption of streambank	
(score each bank, determine sides by facing downstream)	trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks or both sides of the stream eroding a fast rate; erosion contributing significant amount of sediment t stream; obvious threat to proper or infrastructure.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankful not able to enter floodplain. Stream deeply entrenched.	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0	
	Over	ALL BUFFER AND FLOODPLA	IN CONDITION	\sim	
	Optimal	Suboptimal	Marginal	Poor	
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: lit or no riparian vegetation due to human activities.	
	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 (4) 3	2 1 0	
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land	
	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
FLOODBLAD	No evidence of floodplain encroachment in the form of fill material, land development, or	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on	
Floodplain Encroach- ment	manmade structures		effect on floodplain function 10 9 8 7 6	floodplain function $\begin{pmatrix} 1 \\ 5 \end{pmatrix} 4 3 2 1 0$	

				Storm Water Outfal	
WATERSHED/SUBSHED	»: G-B-OL	1 Games I	5 / DATE: 6/4	ASSESSED BY	DYS
SURVEY REACH ID:	(-13-04 TH	ME: <u>7</u> : <u>10</u> AM/PN		era-Pic #) DS Calum /#	1728 1720
SITE ID (Condition-#): O	T- <u>01</u> La	т <u>чь ° 65 ' 58</u>	" LONG 12.0 14	<u> 중.예</u> " LMK	GPS: (Unit ID)
BANK: LT RT Head FLOW: None Trickle	TYPE: Closed pipe	MATERIAL: Concrete PVC/Plastic Other:	SHAPE: Sir Metal MCircular D Brick Elliptical Tr Other:	ouble d	SUBMERGED:
Moderate Substantial Other:	Dpen channel	Concrete E	arthen Trapezoid Parabolic Other:	Depth:(in Width (Top):(in) " (Bottom):(in)	NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: NO Gas Sewage Rancid/Sour	DEPOSITS/STAINS None Oily Flow Line	S: VEGGIE DENSITY	7: PIPE BENTHIC G Brown Ora Other:	ange 🗌 Green
Corrosion	Sulfide	Paint Other:	☐ Infinited ☐ Excessive ☑ Other: Digitice DISCHAR	POOL QUALITY: Good Odors Suds Algae	Colors Oils
CONCERNS: Need	ess Trash (paper/pla ls Regular Mainten	ance 🗌 Ba	umping (bulk) 🗌 Exce ank Erosion 🐼 Othe stigation 🗌 Stream daylight	essive Sedimentation pr: None	Other:
If yes for daylighting: Length of vegetative cove If yes for stormwater: Is stormwater currently co Yes No I No to	ontrolled?	Land	of existing vegetation: Use description: <u>Fuduer</u> vailable: ON EMBAUM	101/ Roodum	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SEVERITY: stron (circle #) stream	vy discharge with a disting smell. The amount of pared to the amount of anm; discharge appears the amount of anticological downstrates and the amount of the	nct color and/or a discharge is significant normal flow in receiving o be having a im.	Small discharge; flow mostly clea discharge has a color and/or odor, discharge is very small compared flow and any impact appears to be	r and odorless. If the , the amount of to the stream's base e minor / localized.	bes not have dry weather e; staining; or appearance g any erosion problems.
SKETCH/NOTES:	5	4	3	2	1
TIME CHARTERS	¥ (viewed c had no	when as en	t of day it	pullerolari
 A Subject of the Constraint Con		- CM -			

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			Sto	orm Water Outfalls	UI		
WATERSHED/SUBS	SHED:		DATE: 6 1 4 10	DATE: $6 1 4 7 7$ Assessed by:			
SURVEY REACH II):GB-4 1	Гіме: <u>7:</u> ЗДАД/рм	Рното ID: (Camera-H	Pic #) /#			
SITE ID (Condition-#): OT- <u>2</u>	LAT 41 º 51 'BUA	"Long 72 . 25 12 2	" LMK GI	PS: (Unit ID)		
BANK: /	Closed	MATERIAL: Concrete M ÝPVC/Plastic Br Other:	ick 🗍 Elliptical 🗍 Triple		SUBMERGED:		
None Tric Moderate Substantial	kle	Concrete Eart		Depth: <u>(in)</u> Width (Top): <u>(in)</u> " (Bottom): <u>(in)</u>	Fully NOT APPESCABLE		
CONDITION: Chip/Cracked Peeling Paint Corrosion	ODOR: 🗍 No Gas Sewage Rancid/Sou Sulfide	☐ None ☐ Oily r ☐ Flow Line ☐ Paint	VEGGIE DENSITY: Mone Normal Inhibited Excessive	PIPE BENTHIC GROWTH: None Brown Orange Green Other: Other: POOL QUALITY: No pool Good Odors Colors			
Other:	Other:	Other:	Other:	Suds Algae Floatables			
FLOWING TU	LOR: CI RBIDITY: CI NO DATABLES: CI NO	one Slight Cloudiness	Cloudy Opaque	Orange Red Othe			
	Excess Trash (paper/j Needs Regular Maint		ping (bulk)	e Sedimentation	<u>a an a</u> chraithean <u>an an a</u>		
POTENTIAL RESTO	PRATION CANDIDA	TE 🗍 Discharge investi	gation 🔲 Stream daylighting	Local stream remain/out	fall stabilization		
🗋 no		Storm water retrof					
If yes for daylightin Length of vegetative		ft Type of	existing vegetation:	Slope:	0		
If yes for stormwate Is stormwater current	ly controlled?	Land Us	e description:				
		Area ava	ilable:				
<i>(circle #)</i> stream discharge appears to be baying a		scharge has a color and/or odor, the a scharge is very small compared to the	discharge; flow mostly clear and odorless. If the rge has a color and/or odor, the amount of rge is very small compared to the stream's base and any impact appears to be minor / localized.				
	5	4	3	2	1.		
SKETCH/NOTES:							
)				Reported to authorities			

				Storm Water Outfall			
WATERSHED/SUBS	HED: Ond Cot	STRK	DATE: <u>6</u> / 4	/한중 ASSESSED BY:	77575		
SURVEY REACH II): GTS-OM 1	'IME: <u>7:30</u> AM/PM	1 Рното ID: (Came		^{\$7} 86		
SITE ID (Condition-#): OT- <u>23</u> L	<u>ат Ц • Б • 42</u>	5" LONG 72 0 25 1		GPS: (Unit ID)		
BANK: LT RT Heat FLOW: Mone Trick Moderate Substantial Other:	Closed	MATERIAL: Concrete	Other:	ouble	SUBMERGED:		
CONDITION: Chip/Cracked Peeling Paint Corrosion Other:	ODOR: M NO Gas Sewage Rancid/Sour Sulfide Other:	DEPOSITS/STAINS	None Normal Inhibited		nge 🗌 Green		
FOR COLOR: Image Clear Brown Grey Yellow Green Orange Red Other: FLOWING TURBIDITY: Image None Slight Cloudiness Cloudy Opaque ONLY FLOATABLES: Image None Sewage (toilet paper, etc.) Petroleum (oil sheen) Other: OTHER Excess Trash (paper/plastic bags) Dumping (bulk) Excessive Sedimentation CONCERNS: Needs Regular Maintenance Image Bank Erosion Other: Storm mater retrofit POTENTIAL RESTORATION CANDIDATE Discharge investigation Stream daylighting Local stream repair/outfall stabilization Image: Storm water retrofit Other:							
If yes for daylighting:							
	stream; discharge appear significant impact downstr 5		flow and any impact appears to be	e minor / localized.	any erosion problems.		
SKETCH/NOTES:	A A A	Dy weos duschow status inknow	ber Y				
)				REPORTED TO AUTHOR	ITIES: YES NO		

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					Stor	m Water O	utfalls	
WATERSHED/SUBSHE	D: GAGES	BK		DATE:	11	ASSESSI	ED BY:	
SURVEY REACH ID:	6-3-04 TI	ME::AM/P	М	Рното ID:	(Camera-Pi	c#)perloyan	1# 17	7.6
SITE ID (Condition-#):	OT- <u>OTA</u> LA	T <u>41° 51 '36</u>	<u>Z''</u> Lo				1	GPS: (Unit ID)
BANK: LT RT Head FLOW: None Trickle	TYPE:	MATERIAL:]Metal]Brick	SHAPE:		DIMENSIO	1 <u>Z (in)</u>	SUBMERGED:
Moderate Substantial	Dpen channel	Concrete E	Carthen	Trapezoid Parabolic	W	FLARED 7 epth: idth (Top): (Bottom):	<u>(in)</u> (in)	Fully
CONDITION: None Chip/Cracked Peeling Paint	ODOR: 🕅 No Gas Sewage Rancid/Sour	DEPOSITS/STAIN	S:	VEGGIE DE	NSITY:	Brown Other:	Orange	WTH: D None
Corrosion Other:	Sulfide	Paint Other: SEDIMENT		Excessive Other:		POOL QUAN Good C Suds C Other:	Odors	Colors Oils
	cess Trash (paper/pla eds Regular Mainten ATION CANDIDATE	ance B	oumping ank Ero estigatio	(bulk) [sion [X] Excessive S] Other:	oil sheen) Sedimentation LFAVF	5	·
Length of vegetative cov If yes for stormwater:							Slope:	0
Is stormwater currently of Yes You Not			Use des availabl	cription: <u>7</u>	ndustrid	1		
SEVERITY: co (circle #) str	eavy discharge with a dist ong smell. The amount o mpared to the amount of ream; discharge appears gnificant impact downstree	inct color and/or a f discharge is significant normal flow in receiving to be having a	Small d discharg discharg	ischarge; flow mos ge has a color and/ ge is very small cor d any impact appea	or odor, the amo npared to the st	ount of diream's base	ischarge; sta	ot have dry weather ining; or appearance / erosion problems.
	5		4	3		2	\sum	1
SKETCH/NOTES:		no Sat	Pat OFYA R	okwe Ipraf				
/					K	EPORTED TO A	UTHORITI	ES: YES NO

				Storm	า Water Outfal	
WATERSHED/SUBSHEI	: GB		DATE: 6	14 108	ASSESSED BY	······································
SURVEY REACH ID: (GB-04 T	IME: 7:45 AM/PM		: (Camera-Pic #		1737,1759
SITE ID (Condition-#): O	T- <u>4B</u> L	AT M10 51 143.			LMK	GPS: (Unit ID)
	1					
BANK: LT XRT Head FLOW:	TYPE:	MATERIAL: □ Concrete ⊠I □ PVC/Plastic □]	SHAPE: Metal A Circular Brick Elliptical		DIMENSIONS: Diameter: $\frac{42}{2}$	$\frac{\text{SUBMERGED:}}{\text{In}} \text{No}$
None Trickle	pipe	Other:	Other:			Fully
Moderate Substantial Other:	Dpen channel	Concrete Ea	rthen Trapezoi	c Wid	th:(in th (Top):(in Bottom):(in	NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: ☑ NO □Gas □ Sewage □Rancid/Sour	DEPOSITS/STAINS	:: VEGGIE DI D None Normal Inhibited	[Brown Or Other:	ROWTH: 🗌 None ange 🗋 Green
Corrosion Other:	Sulfide Other:	Paint Other:	Imitolea Excessive Other:	e [POOL QUALITY: Good Odors Suds Algae Other:	Colors Oils
	ITY: Nor	ie 🔄 Slight Cloudine ne 🔄 Sewage (toilet p lastic bags) 🔤 Du	ss 🗌 Cloudy 🛛	Green 0 Opaque Petroleum (oi Excessive Se Other:		Other:
POTENTIAL RESTORAT	FION CANDIDAT	E 🔀 Discharge inves		aylighting 🔲	Local stream repa	ir/outfall stabilization
<i>If yes for daylighting:</i> Length of vegetative cove	r from outfall:	ft Type c	of existing vegetation	· · · · · · · · · · · · · · · · · · ·	Slope	o:°
If yes for stormwater: Is stormwater currently co Yes No Not			Jse description: vailable:	<u></u>		
SEVERITY: stron (circle #) stread	pared to the amount o am; discharge appears ificant impact downstre	of discharge is significant f normal flow in receiving s to be having a eam.	Small discharge; flow mo discharge has a color and discharge is very small co flow and any impact appe	d/or odor, the amour ompared to the strea ears to be minor / loo	nt of discharg am's base calized.	oes not have dry weather e; staining; or appearance ig any erosion problems.
SKETCH/NOTES:	5	4		3	2	1
SKETCHARDLES.	-4B 	B SC LILILI J S				
)				Rep	ORTED TO AUTHO	RITIES: VES NO

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Storm	Water	Outfalls
QU1111	vvalo:	Vuudiis.

0	T

WATERSHED/SUBSHE	D:		DATE: 6 1 4 16	ASSESSED BY:	
SURVEY REACH ID:	GB-04 T	IME: 7 : 45AM/PM	Рното ID: (Camera-Pi	======================================	739
SITE ID (Condition-#): ()T- <u>5</u> L	AT 410 51 143.8 " LO	ONG 72 . 25 . 11.1 "	LMK	GPS: (Unit ID)
BANK:	TYPE:	MATERIAL:	SHAPE: Single	DIMENSIONS:	SUBMERGED:
FLOW:	Closed	PVC/Plastic Brick	Elliptical Triple	Diameter: 24 (in)	⊠No □ Partially
None Trickle	pipe	Other:	Other:	2 2	Fully
Moderate		Concrete Earthen	Trapezoid De	epth:(in)	\square
Other:	Open channel	Other:	Parabolic W	idth (Top): (in)	NOT APPEICABLE
			Other: "	(Bottom):(in)	
CONDITION:	ODOR: ⊠NO □Gas	DEPOSITS/STAINS:	VEGGIE DENSITY:	PIPE BENTHIC GRO	
Chip/Cracked	Sewage	Oily	Normal	Brown Orang	e 🗌 Green
Peeling Paint	Rancid/Sour	Flow Line	Inhibited	POOL QUALITY:	ZNo pool
Corrosion Other:	U Sulfide	Paint Other:		Good Odors	Colors Oils
	L Other.		Other:	Suds Algae	Floatables
FOR COLOR FLOWING TURBID				Orange 🗌 Red 🗌 Ot	her:
FLOWINGTURBIDONLYFLOATA	CONTRACT CONTRACTOR PLANE AND A CONTRACT OF A CONTRACT OF A		Cloudy Opaque etc.) Petroleum (oil sheen) 🗌 Ot	her
	ess Trash (paper/pl				ner,
CONCERNS: Nee	ds Regular Mainter	nance 🗌 Bank Ero			
BOTENTIAL DEGEODIN					
no	FION CANDIDAT	E Discharge investigation		Local stream repair/o	utfall stabilization
If yes for daylighting:			Other:		
	er from outfall:	ft Type of exist	ing vegetation:	Slope:	o
				······································	
<i>If yes for stormwater:</i> Is stormwater currently co	ontrolled?	Land Use des	ominitions		
Yes No Not		Area available	· · · · · · · · · · · · · · · · · · ·		1
OUTFALL Hea	vy discharge with a dis	tinct color and/or a Small di	ischarge; flow mostly clear and od	orless of the	
(circle #)	pared to the amount of	normal flow in receiving discharge	ge has a color and/or odor, the amo	ount of Outian does	not have dry weather aining; or appearance
310	am; discharge appears ificant impact downstre	to be having a	ge is very small compared to the st I any impact appears to be minor /		y erosion problems.
	5	4	3	2	1
SKETCH/NOTES:			(
	OT 4	- ACB - HI	LESC		
	- the				
		> 075 5	and the second		
	have				
		7			
3		l	Managa Ang		
)			R	EPORTED TO AUTHORIT	IES: YES NO

					Stre	am Cros	ssing SC
WATERSHED	SUBSHED: GOALS		D	ате: 6	14108	ASSE	SSED BY; KS
URVEY REA		TIME: 7 : 4					way 1# 1738
	a a sa a Masili ng ka di	······································	.8" LONG 72			MK	GPS (Unit ID)
					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
TYPE: 🛛 Roa	ad Crossing 🔲 Railroad Crossi		1	Dam 🔲	Geological For		
For Road/ Railroad	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS:	MATERIAL: Concrete Metal Other:	Flc	NMENT: pw-aligned t flow-aligned not know	Barrel dia	IONS: (if variable, sketch) ameter: <u>70 in (ft)</u> Height: <u>(ft)</u>
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	n 🔲 Downstrear 🗌 Failing emb		Fla	<b>ERT SLOPE:</b> it ght $(2^{\circ} - 5^{\circ})$ vious (>5°)	Culvert le Roadway	Ength:         E0.60 (ft)           Width:         (ft)           elevation:         (ft)
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re	emoval 🗌 Culvert repair 🔲 Other:	repair/rej	placement 🔲 🛛	Upstream s	torage retrofit
IS SC ACTING	G AS GRADE CONTROL	X No Y	es 🗌 Unknov	vn			
	EXTENT OF PHYSICAL BLO	r		BLO	CKAGE SEVER	RITY: (circ	·le #)
If yes for       If yes for         If yes for       CAUSE:         If Drop too high       Water Drop:         If Flow too shallow       Water Depth:         G-12       (in)		A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present. A total fish block tributary that wo significant reach or partial blocka interfere with the anadromous fish		ld isolate a of stream, e that may migration of	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.		
<u></u>	Other:		5		4 3		2 1
NOTES/SKET	TCH: Note: wet	THE BELST	llon wod	· · · · · · · · · · · · · · · · · · · ·	Tredu	Acepe	

Reach Level Assessment RCH

SURVEY REACH ]	D: GB-OFA WI	RSHD/SUBSHD:	ons Bh	DATE: 6/4	108 AS	SSESSED BY:	
Start Tim	E: 9 : 00 AM/PM		- J - Aller Size	1	LMK:	Wann	GPS ID:
LAT 410 51 1		2 • 25 11.2"	LAT 41° 51 '4	"Manual Con-	-		GI S ID.
DESCRIPTION:		A had lis m	DESCRIPTION:	LUNG 1	<u> </u>	01.2	
DESCRIPTION.			DESCRIPTION:				
RAIN IN LAST 24 HC		□ Steady rain	PRESENT CONDITIONS	□ Heavy rain	🗹 Steady r	ain 🗆 Intern	nittent
□ None	Intermittent		□ Clear		□ Overcas	st 🗆 Partly	v cloudy
SURROUNDING LAN		l 🔄 Commercial rse 🗆 Park	□ Urban/Residential □ Crop	□ Suburban/Res □ Pasture	□ Forested □ Other:		tional
AVERAGE	CONDITIONS (che	ck applicable)	REACH	SKETCH AND SIT	E IMPACT	TRACKING	
BASE FLOW AS %	□ 0-25%	☑ 50%-75%	Simple planar sketch	of survey reach. Trac	ck locations ar	nd IDs for all s	ite impacts
CHANNEL WIDTH	□25-50 %	□ 75-100%	within the survey re	ach (OT, ER, IB,SC, deemed appropriate.	UT, TR, MI) a.	s well as any a	dditional
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5	slick) 🖾 Co	obble (2.5 –10") oulder (>10") od rock		ucemea appropriate.	Indicule dire	cuon of flow	
WATER CLARITY	aturally colored) 🛛 dyes)	Opaque (milky)					
AQUATIC PLANTS	/	e $\Box$ some $\Box$ lots e $\Box$ some $\Box$ lots					
	(Evidence of)		_				
WILDLIFE IN OR AROUND STREAM	☐ Fish ☐ Beav ☐ Snails ☐ Other						
STREAM SHADING (water surface)	<ul> <li>☑ Mostly shaded</li> <li>□ Halfway (≥50%</li> <li>□ Partially shaded</li> <li>□ Unshaded (&lt; 25</li> </ul>	)) I (≥25% )		55	la -		
CHANNEL	Downcutting	Bed scour	Story	A.			
DYNAMICS	Widening Headcutting Aggrading	Bank failure Bank scour Slope failure	autwirt 72		Lallen	free	
Unknown	Sed. deposition		work for the second second	<b>una</b> nni 1911 de la	$\vee$		
CHANNEL	Height: LT bank	<u> </u>	ALDOS P				
DIMENSIONS	RT bank	(ft)		ì			
(FACING DOWNSTREAM)	Width: Bottom	(ft)	105.022 >				
DOMISINGALWI	Top	(ft)	for a l	$\sim$			
R	EACH ACCESSIBILI		-	< e ot			
Good: Open area in	Fair: Forested or	Difficult. Must cross		- the	h,		
public ownership,	developed area adjacent to stream.	wetland, steep slope, or sensitive areas to get to	1 \2	1 tree			
sufficient room to stockpile materials,	Access requires tree	stream. Few areas to	1	Innl			
easy stream channel	removal or impact to	stockpile available		Verdendament	n an Star Balancia Soction de Constante de Constante d'		
access for heavy	landscaped areas. Stockpile areas	and/or located a great distance from stream.	Indus	tral East			
equipment using existing roads or trails.	small or distant from	Specialized heavy	1-1 and an and a second second	on an	9.5.7 Magtasenska 2007-silan seksedikasi barange	telesteles	
	stream.	equipment required.	-				
NOTES: (biggest prob							
)		*					
	nonic						
				Denor			
				KEPOR	IED TO AUTH	IORITIES 🗌	LES LINO

	Optimal	Suboptimal	Marginal	Poor
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat of habitat is obvious; substra unstable or lacking.
	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the stream surfaces covered by vegetati disruption of streambank vegetation is very high; veget has been removed to 5 centimeters or less in avera stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks both sides of the stream erod a fast rate; erosion contributir significant amount of sedimer stream; obvious threat to prop or infrastructure.
	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched. 20 19 18 17 16	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bank not able to enter floodplain. Stream deeply entrenched.
	Over	ALL BUFFER AND FLOODPLAI	Land the second s	I <u>· · · · · · · · · · · · · · · · · · ·</u>
2.45-2.76	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	of buffer zone >50 feet; human es (i.e., parking lots, roadbeds, cuts, lawns, crops) have not		Width of buffer zone <10 feet: or no riparian vegetation due t human activities.
	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegeta type is turf or crop land
	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	3 4 3 2 1 0
Floodplain Encroach-	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some	Significant floodplain encroachment (i.e. fill material land development, or man-ma structures). Significant effect
MENT	20 19 18 17 16		effect on floodplain function	floodplain function

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			Storn	n Water Outfalls	ΟΤ
WATERSHED/SUBS	HED: CASTS	BK	DATE: 6 1 4 109	ASSESSED BY:	DRIS
SURVEY REACH II	): 66-054 TI	ME: 4 : 15 AM/PM	PHOTO ID: (Camera-Pic	#) DRC WON/# 1	741
SITE ID (Condition-#	): OT- <u>01</u> LA	T, <u>St</u> , T	ONG'	LMK G	<b>GPS:</b> (Unit ID)
BANK: LT RT Heat FLOW: Moderate	kle	MATERIAL: Concrete Meta PVC/Plastic Brick Other:	Elliptical Triple	DIMENSIONS: Diameter: 2 (in)	SUBMERGED:
U Substantial Other:	Open channel	Concrete Earther	Parabolic Wid	dth (Top):         (in)           (Bottom):         (in)	NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: ⊠ NO □Gas □ Sewage □Rancid/Sour	DEPOSITS/STAINS: None Oily Flow Line Paint	☐ None ☑ Normal ☐ Inhibited	PIPE BENTHIC GROV Brown Orange Other: POOL QUALITY:	Green
Corrosion Other:	Sulfide	Sugges	Excessive     Other:	□ Good □Odors □ □ Suds □ Algae □ ☑ Other: ♂♂७६७%	Colors Oils Floatables
FLOWING TUR ONLY FLO	.OR:     Image: Clear       BIDITY:     Image: Clear       ATABLES:     Image: Clear       Excess Trash (paper/pla	Slight Cloudiness	Cloudy Opaque etc.) Petroleum (o		
	Needs Regular Mainten	ance 🗌 Bank E		t pedment	40-11 - 4 - L - 12 42 -
no		Storm water retrofit	Other:	Local stream repair/ou	trail stabilization
<i>If yes for daylightin</i> Length of vegetative of	0	ft Type of exi	sting vegetation:	Slope:	o
If yes for stormwate Is stormwater current Yes No Y	y controlled?	Land Use d Area availal	A	mid	
OUTFALL SEVERITY: (circle #)	Heavy discharge with a disti strong smell. The amount of compared to the amount of stream; discharge appears t significant impact downstrea 5	discharge is significant normal flow in receiving o be having a	discharge; flow mostly clear and odor rge has a color and/or odor, the amou rge is very small compared to the stre and any impact appears to be minor / lc 	unt of discharge; stal	ot have dry weather ining; or appearance erosion problems.
SKETCH/NOTES:		901		<u>{</u>	1
Ŏ		mman we dischar	X weather Je		
)			Re	PORTED TO AUTHORITII	2S: 🗌 YES 🗌 NO

Reach Level Assessment

ent	RCH
ASSE	SSED BY:

				-1 [.]		
SURVEY REACH	D: <u>САЗ-056</u> W1	rshd/Subshd: Ge	where Ble	DATE: <u>614</u>	_/ Asse	CSSED BY:
START TIM	E:2_:10_AM/PM	b LMK:	END TIME:	: 45 AM/PM	LMK:	GPS ID:
LAT 41 051 1	Long	2025 106.3"	LAT			
DESCRIPTION:			DESCRIPTION:	<u> </u>		<u> </u>
<i>P</i>	hora 176	/				
RAIN IN LAST 24 HO	OURS 🗆 Heavy rain	□ Steady rain	PRESENT CONDITIONS	□ Heavy rain	□ Steady rain	Intermittent
□ None	Intermittent	□ Trace	□ Clear	□ Trace	□ Overcast	□ Partly cloudy
SURROUNDING LAN	D USE: 🗆 Industria	l 🗆 Commercial	□ Urban/Residential	Suburban/Res	□ Forested	
	🗆 Golf cou	rse 🗆 Park		□ Pasture	□ Other:	
Average	CONDITIONS (che	ck applicable)	REACH	SKETCH AND SI	ГЕ ІМРАСТ ТБ	ACKING
BASE FLOW AS %	□ 0-25%	<b>⊡</b> ‴50%-75%	Simple planar sketch o	of survey reach. Tra	ck locations and l	IDs for all site impacts
CHANNEL WIDTH	□25-50 %	□ 75-100%	within the survey rec	<u>ach (OT, ER, IB,SC,</u> deemed appropriate.	UT, TR, MI) as w	ell as any additional
DOMINANT SUBSTR	ATE	~	Jean Jean Constant		malcule alrectio	n oj jiow
□ Silt/clay (fine or		bble (2.5 –10")	XXX	52-2 ad post	RA	
□ Sand (gritty)	🗆 Be	oulder (>10")			Ç	
🕑 Gravel (0.1-2.5	5") 🗆 🗆 Be	d rock	115	and the second		
WATER CLARITY	Clear DTurbic	(suspended matter)		man - S had the firmer		
	aturally colored)			-B-1		
$\Box$ Other (chemicals,		o paque (ming)	17 14	waf (* )		
	Attached: D non	e 🖾 some 🗆 lots				
AQUATIC PLANTS IN STREAM						
INGIREAM	(Evidence of)	e □ some □ lots		Plate		
WILDLIFE IN OR	$\square$ Fish $\square$ Beave	er 🕑 Deer		Call march		
AROUND STREAM	$\Box$ Snails $\Box$ Other		S Star	· · ······		
	□ Mostly shaded (	>75% coverage)				
STREAM SHADING	$\Box$ Halfway ( $\geq 50\%$			J.		
(water surface)	□ Partially shaded		in the second			
	Unshaded (< 25	%)	0			
CHANNEL	Downcutting	Bed scour	refer	***************		
DYNAMICS	Widening	Bank failure	0.50	\$ }		
	Headcutting	Bank scour	(			
Unknown	Aggrading	Slope failure				
	Sed. deposition	h Channelized				
CHANNEL	Height: LT bank	(ft)	60	)T-1		
CHANNEL DIMENSIONS	RT bank	(ft)				
(FACING	Width: Bottom	<u> </u>	Brita	4900/saugusteen		
DOWNSTREAM)				MAN DO WINN NOT T		
	Тор	(ft)	no			
1	EACH ACCESSIBILIT	TY Difficult. Must cross				
Good: Open area in	developed area	wetland, steep slope, or	and the second second			
public ownership, sufficient room to	adjacent to stream.	sensitive areas to get to	a construction of the second			
stockpile materials,	Access requires tree removal or impact to	stream. Few areas to stockpile available	And the second se			
easy stream channel	landscaped areas.	and/or located a great	and the second sec			
access for heavy equipment using	Stockpile areas	distance from stream.		æ		
existing roads or trails.	small or distant from	Specialized heavy	1	. 1		
5 2	-stream.	equipment required.	- Christe	24		
NOTES: (biggest prob		reach)	1 <u>7 * ² Gire</u>			
)						
r						
				D		
		· · · · · · · · · · · · · · · · · · ·		REPOR	FED TO AUTHOR	ITIES YES NO

	Optimal	Suboptimal	Marginal	Poor
IN-STREAM HABITAT (May modify criteria based on appropriate	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lac of habitat is obvious; substrate unstable or lacking.
habitat regime)	that are not new fall and not transient).	rate at high end of scale).		
	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambant surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	Over	ALL BUFFER AND FLOODPLA	N CONDITION	$\sim$
	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 (4) 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
FLOODPLAIN Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Encroach-	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplaic function
MENT	20 19 18 17 16		enection noouplain function	floodplain function

Storm Water Outfalls									
WATERSHED/SUBSI	HED: GAGES -	BU	DA	ате: <u>6 / ч</u>	1 108	ASSES	SED BY:	DRB	
SURVEY REACH ID	:GB-053 1	`IME:AM/PI	м Рн	юто ID: (Ca	mera-Pic #	)DB( inc	/# 1	768	
SITE ID (Condition-#)	0T- <u>O(</u> 1	AT <u>410 57 145</u>				LMK_		GPS: (Unit ID)	
BANK: LT RT Hea FLOW: None Trick Moderate	Closed	PVC/Plastic C	]Metal X ]Brick (]	APE: S Circular S Elliptical O Other: Trapezoid	Double Triple		<u> 6 (in)</u>	SUBMERGED:	
Substantial Other: Very slight	Open channel	Concrete E	artnen	Parabolic Other:		n h (Top): 3ottom):		NOT APPESICABLE	
CONDITION: Chip/Cracked Peeling Paint	ODOR: ANO	□ None □Oily		GGIE DENSI None Normal Inhibited		Brown Other:	🗌 Orango		
Corrosion	Sulfide	Paint Mother: Milder Mole		Excessive Other:		Good [	ALITY: <u>K</u> Odors [ Algae [	Colors Doils	
FOR       COLOR:       Clear       Brown       Grey       Yellow       Green       Orange       Red       Other:         FLOWING ONLY       TURBIDITY:       None       Slight Cloudiness       Cloudy       Opaque       Description       Discource         ONLY       FLOATABLES:       None       Sewage (toilet paper, etc.)       Petroleum (oil sheen)       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation         CONCERNS:       Needs Regular Maintenance       Bank Erosion       Other:         POTENTIAL RESTORATION CANDIDATE       Discharge investigation       Stream daylighting       Local stream repair/outfall stabilization         no       Storm water retrofit       Other:									
<i>If yes for daylighting</i> Length of vegetative c	0	ft Type	of existing v	regetation:			Slope:	o	
If yes for stormwate Is stormwater currentl X Yes □ No □ N	y controlled?	Land Area	Use descript available:	ion: Comm	evit M.	dustrie	1 (sofruo	м со.)	
<b>SEVERITY:</b> (circle #)		of discharge is significant of normal flow in receiving is to be having a	discharge has discharge is v	ge; flow mostly closed a color and/or od ery small compare impact appears to	lor, the amoun ed to the strea	t of m's base alized.	discharge; sta of causing an	not have dry weather aining; or appearance y erosion problems.	
SKETCH/NOTES:	<u>&gt;</u>	in soil )	4 G1255	(1)		2		1	
junk lippe	. 1) MA	. (	(	murorer		Parking Lot			
<u>)</u>		lacessive /			REP	ORTED TO	AUTHORITI	es: 🗌 yes 🖉 no	

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					Se	evere Ba	ank Erc	sion	EF	2
WATERSHED/SUB	SHED: GAGES	BU		DATE:	14	108	ASSESS	SED BY:	DEB	
SURVEY REACH:	GRACT	TIME: 2	2 <u>0</u> am/pm	Рното Г	D (CAME	ERA-PIC #	).mp/	/# ***		
SITE ID: (Condition-	#) START LAT	1051 142.71	" Long 72.°	25 104311	Ĭ	JMK	1. N. O. C. W.	GPS: (L		
ER	END LAT	1 ° 51 49.2	" LONG <u>72</u> °. " LONG <u>72</u> °.	25 101.3"	I			(		
PROCESS:	Currently unknown Bed scour Bank failure Bank scour Slope failure Channelized	LOCATION: { DIMENSIONS Length (if no C Bank Ht Bank Angle	<i>GPS</i> ) LT LT_ <u>5-5</u> LT	d □ Straight : _ft and/or F _ft and/or F _° and/or F	section [ RT RT RT	☐ Steep s ft ft °	lope/valle Bottor Top w Wetter	ey wall [ n width ridth d Width	<u>3</u> ft <u>8</u> ft <u>3.5</u> ft	RUDC- CANSCI
	ORATION CANDIDATE								ATE PAA	
No	JRATION CANDIDATE	C: Crade		🛛 Bank stab	oilization					
THREAT TO PROP	ERTY/INFRASTRUCT	JRE: 🛛 No	Yes (Desc	ribe):						
EXISTING RIPARIA	AN WIDTH:	<b>⊠</b> ≤25 ft	☐ 25 - 50 ft	☐ 50-75ft	75-1	00ft [	]>100ft	t		
EROSION SEVERITY(circle#) Channelized= 1	Active downcutting; tall ban of the stream eroding at a fa contributing significant amo stream; obvious threat to pr infrastructure.	ast rate; erosion unt of sediment to	Pat downcutting ev widening, banks ac moderate rate; no infrastructure	ctively eroding at a	1	failure/eros	ion; likely c		eas of bank vipe outfall, loo or adjacent u	
	5		4	3	2			1		
ACCESS:	Good access: Open area in ownership, sufficient room t materials, easy stream char heavy equipment using exis trails.	o stockpile inel access for	Fair access: Fores adjacent to stream removal or impact Stockpile areas sm	. Access requires to landscaped are	tree as.	other sensi stockpile a	tive areas to reas availab om stream s	o access stre	nd, steep slop eam. Minimal cated a great cialized heavy	
	5	(4	)	3	2			1		
NOTES/CROSS SEC	Grass		HILL G	2.465	na po n bo	o to o conclus nong .	to and the second	dernig Dyr. ( veneb tervil	mpay sola Sover Ve a	Rej
)	(AS	FALLEN SOD CLUM				Reporte	D TO AUTI	HORITIES	Yes 🗌	No

Stream Crossing SC

WATERSHED				<u>Date:                                    </u>	<u>  4   108</u>		SSED BY:
JURVEY REA					D: (Camera-Pie		
SITE ID: (Con	dition-#) SC- <u>(?)</u> LAT	<u>11051 147</u>	<u>/</u> " Long 72	<u>°25</u> '	<u> 2 "</u> L	MK	GPS (Unit ID)
TYPE: 🗹 Roa	ad Crossing 🔲 Railroad Crossir	ng 🔲 Manmade I	Dam 🔲 Beaver	Dam 🔲	Geological For	mation 🔲	Other:
	Shape:	# BARRELS:	MATERIAL:	ALIG	NMENT:	DIMENS	IONS: (if variable, sketch)
	Arch Bottomless	Single	Concrete		ow-aligned	Barrel dia	ameter: <u>3</u> (ft)
FOR ROAD/	Box Elliptical	Double	Metal		ot flow-aligned		Height: <u>3</u> (ft)
RAILROAD	Other:	Other:	Other:		o not know		Rectioner general
CROSSINGS ONLY	<b>CONDITION:</b> (Evidence of)				/ERT SLOPE:	Culvert le	
UNLY	Cracking/chipping/corrosion			Fla	at ight (2° – 5 ⁰ )		Width:(ft)
	Sediment deposition	🗌 Failing emb	ankment	1	prious (>5°)	Poodway	elevation:(ft)
	Other ( <i>describe</i> ):				, , , , , , , , , , , , , , , , , , ,	Roadway	
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re	moval 🔲 Culve	rt repair/re	placement	Upstream s	torage retrofit
no		Local stream		-			
IS SC ACTING	G AS GRADE CONTROL	No Y	es 🗌 Unkn	own			
	EXTENT OF PHYSICAL BLO	CKAGE:		BLC	CKAGE SEVE	RITY: (circ	ele #)
	Total Partial Temporary Unknow	un .	A structure such as	a dam or	A total fish blocka	age on a	A temporary barrier such as a
If yes for		road culvert on a 3		tributary that wou significant reach			
fish barrier	CAUSE: Drop too high Water Dr	op: <u>3-4</u> (in)	upstream movement	nt of	or partial blockage		very little viable fish habitat
	$\square$ Flow too shallow Water De		anadromous fish; n passage device pre		interfere with the anadromous fish.		above it; natural barriers such as waterfalls.
)	Other:	1 ( )	5		4 3		2 1
NOTES/SKET	°СН:		<u> </u>		<u> </u>		
			an and an	««تَصوقين»»، والتي			
	مردن . مردن .		- 473-man(4)2 mar - 1				
	647 ⁷⁴			1			
	محمد محمد						
		K	1				
		$\sim$					
		No					
)					_		
L					REPOR	TED TO AU	THORITIES 🗌 YES 🗌 NO

Stream Crossing

WATERSHED/SUBSHED:       Concession       DATE:       J. 4 J. 25       ASSESSED BY:         URVEY REACH ID:       Concession       TIME:       J. 4 J. 25       ASSESSED BY:         URVEY REACH ID:       Concession       LAT       J. 5 TOR DO:       Clamera-Pic #)       Concession       H [17] 7 5         STIE ID:       (Condition:#)       SC-02       LAT       J. 6 J. 5 TOR DO:       Clamera-Pic #)       Concession       GPS (Unit D)         TYPE:       Road Crossing       Railroad Crossing       Manmade Dam       Beaver Dam       Geological Formation       Other:         Box       Elliptical       Single       Concrete       Flow-aligned       Dimessions: (f variable, steech)         Brok       Elliptical       Double       Metal       Not flow-aligned       Height:       U. 2.1.0. (ft)         Constring       Other:       Other:       Other:       Culvert SLOPE:       Culvert length:       W/D. (ft)         ONLY       Concestion       Downstream scour hole       Sight (2° - 5°)       Ovious (>5°)       Roadway elevation:       (ft)         Science       Gondard constront       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         Onter:       Local stream repair       Other:
STTE ID: (Condition #) SC-O2       LAT 1/1 ° 5/1 * 5/5 " LONG 72 ° 25 ' 0 = "       LMK       GPS (Unit ID)         TYPE: Codd Crossing Railroad Crossing Manmade Dam       Beaver Dam       Geological Formation       Other:         Arch       Bottomless       Single       Double       Material:       ALIGNMENT:       Dimessions: (if variable, sketch)         Box       Elliptical       Arch       Bottomless       Single       Double       Material:       ALIGNMENT:       Barel diameter:       1/2 0.1 (ft)         RAILROAD       Other:       Other:       Double       Material:       Barel diameter:       1/2 0.1 (ft)         Crossings       Constrion:       (ft)       Bottometer:       0 0ther:       0
FOR ROAD/       SHAPE:       # BARRELS:       MATERIAL:       ALIGNMENT:       DIMENSIONS: (if variable, sketch)         Box       Elliptical $\Box$ Single       Double       Not flow-aligned       Barrel diameter: $\Box$ One-rete $\Box$ Bow-aligned         MATERIACAD       Cracking/chipping/corrosion       Double $\Box$ Metal       Do not know       Barrel diameter: $\Box$ One-rete         ONLY       Constructor       Constructor $\Box$ Downstream scour hole $\Box$ Flat       Do not know         Cacking/chipping/corrosion       Downstream scour hole $\Box$ Flat       Slight (2° - 5°)       Culvert length: $\Box$ One-rete         Other (describe): $\Box$ Other: $\Box$ Local stream repair       Other:       Obscius (>5°)       Roadway elevation: $\square$ (ft)         Portential Restoration Candidate       Isocal stream repair       Other:       Isocal stream repair       Other: $\square$ caluer on a 3d order or grade stream blocking the migration of a stream with very liked of stream, or patial blockage on a though the work of distere and or passage device present.       A total fish blockage on a though the work of distere and or passage device present.       A total fish blockage on a though the work of distere and or passage device present.       A temporary barrier such as a basever dam or a blockage at any or patial blockage on a though the work field of a stream with very liked of a stream with very liked of a stream
FOR ROAD/       SHAPE:       # BARRELS:       MATERIAL:       ALIGNMENT:       DIMENSIONS: (if variable, sketch)         Box       Elliptical $\Box$ Single       Double       Not flow-aligned       Barrel diameter: $\Box$ One-rete $\Box$ Bow-aligned         MATERIACAD       Cracking/chipping/corrosion       Double $\Box$ Metal       Do not know       Barrel diameter: $\Box$ One-rete         ONLY       Constructor       Constructor $\Box$ Downstream scour hole $\Box$ Flat       Do not know         Cacking/chipping/corrosion       Downstream scour hole $\Box$ Flat       Slight (2° - 5°)       Culvert length: $\Box$ One-rete         Other (describe): $\Box$ Other: $\Box$ Local stream repair       Other:       Obscius (>5°)       Roadway elevation: $\square$ (ft)         Portential Restoration Candidate       Isocal stream repair       Other:       Isocal stream repair       Other: $\square$ caluer on a 3d order or grade stream blocking the migration of a stream with very liked of stream, or patial blockage on a though the work of distere and or passage device present.       A total fish blockage on a though the work of distere and or passage device present.       A total fish blockage on a though the work of distere and or passage device present.       A temporary barrier such as a basever dam or a blockage at any or patial blockage on a though the work field of a stream with very liked of a stream with very liked of a stream
FOR ROAD/ RAILROAD       Arch       Bottomless       Single       Concrete       Flow-aligned         Box       Elliptical       Double       Metal       Not flow-aligned       Height:       U.Q.A. (ft)         RAILROAD       CrossIngs       Other:       Other:       Concrete       Flow height:       U.Q.A. (ft)         CROSSINGS       CONDITION: (Evidence of)       Concrete       Flat       Do not know       Culvert slope:         ONLY       Cracking/chipping/corrosion       Downstream scour hole       Flat       Culvert slope:       Width:       U.O.(ft)         Construct       Failing embankment       Obvious (>5°)       Obvious (>5°)       Roadway elevation:       (ft)         POTENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         In o       Local stream repair       Other:       Other:       A temporary barrier such as a dam or rog duelen on a 3rd order or greater stream blocking the upstream novement of anadromous fish, no fish       A temporary barrier such as a beaver dam or a blockage at the very ittle viable fash habitat above it, natural barriers such as a dam or rog dueler on a 3rd order or greater stream blocking the upstream storage fast reach of stream, or patial blockage that may interfere with the migrafon of anadromous fish, no fish         If yes for fish barrier       CAUSE:       Interfere with the
For ROAD/ RAILROAD CROSSINGS ONLY       Box       Elliptical       Double       Metal       Not flow-aligned         Other:       Other:       Other:       Other:       Other:       CULVERT SLOPE:         ONLY       Construction       Downstream scour hole       Flat       Slight (2° - 5°)       Culvert length:       U/O.(ft)         Width:       U/O.(ft)       Sediment deposition       Failing embankment       Obvious (>5°)       Roadway elevation:       (ft)         POTENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         Imo       Local stream repair       Other:       Other:       A total fish blockage on a toporary barrier such as a dam or or greater stream blocking the upstream storage retrofit habitat         If yes for fish barrier       CAUSE:       Sportop too high water Drop:       (in)         If yes for fish barrier       Flow too shallow water Depth:       (in)       Sage device present.       A temporary barrier such as a dam or or greater stream blocking the upstream movement of anadromous fish, no fish passage device present.       A temporary barrier such as a waterfails.         MOTES/SKETCH:       Stuct:       5       4       3       2       1
RAILROAD CROSSINGS ONLY       Other:       Other:       Other:       Do not know         CROSSINGS ONLY       ConDITION: (Evidence of)       Culvert length:       Umage: Culvert length:       Culvert length:       Umage: Culvert length:       Culvert length:       Umage: Culvert length:       Culvert length:       Culvert length:       Culvert length:       Culvert l
ONLY       Constraints, (underce of)       Constraints, (underce of)       Constraints, (underce of) $\Box$ Cacking/chipping/corrosion       Downstream scour hole       Flat       Flat $\Box$ Sediment deposition       Failing embankment       District Stope:       Width: $U$ (int) $\Box$ Other (describe): $\Box$ other (describe): $\Box$ other (describe): $\Box$ other       Roadway elevation: $\square$ (ft)         POTENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit $\Box$ no       Local stream repair       Other:       No       Yes       Unknown         If yes for       Total       Partial       A structure such as a dam or read culver to a 3d order or gratial blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish; no fish passage device present.       A total fish blockage that may interfere with the migration of anadromous fish.       A startural barriers such as a waterfalls. $D$ other:       5       4       3/       2       1
□Cracking/chipping/corrosion       □ Downstream scour hole       □ I Hat       □ I Hat       □ I Hat         □ Sediment deposition       □ Failing embankment       □ Slight (2° - 5°)       □ Roadway elevation:
□ Obvious (>5°)       Roadway elevation:(ft)         □ Dovious (>5°)
POTENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         Image: Stream repair       Other:       Is SC ACTING AS GRADE CONTROL       No       Yes       Unknown         EXTENT OF PHYSICAL BLOCKAGE:       Total       Partial       A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish, no fish passage device present.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A temporary barrier such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A temporary barrier such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A temporary barrier such as a dam or or a blockage at the very head of a stream with very little viable fish habitat and barriers such as a dam or a addromous fish.       A temporary address the very head of a stream with very little viable fish habitat and barriers such as a dam or a blockage at the very head of a stream with very little viable fish habitat address the very head of a stream with very little viable fish habitat address the very head of a stream with very little viable fish habitat address the very head of a stream wit
Imo       Is SC ACTING AS GRADE CONTROL       No       Yes       Unknown         Is SC ACTING AS GRADE CONTROL       No       Yes       Unknown         EXTENT OF PHYSICAL BLOCKAGE:       BLOCKAGE SEVERITY: (circle #)         Total       Partial         Temporary       Unknown         If yes for       Fish barrier         CAUSE:       Imode the property of the passage device present.         Plow too shallow Water Drop:       Imode the property (in)         Imode the property of the passage device present.       State of the property of the passage device present.         Imode the property of the passage device present.       State of the property of the passage device present.         Imode the property of the passage device present.       State of the property of the passage device present.         Imode the property of the property of the passage device present.       State of the property of the passage device present.         Imode the property of the property of the passage device present.       State of the property of the passage device present.         Imode the property of
Is SC ACTING AS GRADE CONTROL       No       Yes       Unknown         EXTENT OF PHYSICAL BLOCKAGE:       BLOCKAGE SEVERITY: (circle #)         Total       Partial         Temporary       Unknown         If yes for       Temporary         fish barrier       CAUSE:         Drop too high       Water Drop:       Z         Flow too shallow       Water Depth:       (in)         Flow too shallow       Water Depth:       5       4       3       2       1         NOTES/SKETCH:       NOTES/SKETCH:       Structure       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish, no fish passage device present.       A total fish habitat above it, natural barriers such as waterfalls.
EXTENT OF PHYSICAL BLOCKAGE:       BLOCKAGE SEVERITY: (circle #)         Total       Partial         Temporary       Unknown         If yes for       Temporary         fish barrier       CAUSE:         Drop too high       Water Drop:       1         Flow too shallow       Water Depth:       1         Other:       5       4       3       2         NOTES/SKETCH:       NOTES/SKETCH:       5       4       3       2       1
If yes for       If yes for         fish barrier       CAUSE:         Drop too high       Water Drop:       Z         Image: Charles       Image: Charles         Image: Charles       A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as a waterfalls.         Image: Other:       5       4       3       2       1         NOTES/SKETCH:       Image: Structure such as a dam or road culver on a 3rd order or greater stream blocking the upstream movement of anadromous fish.       3       2       1
If yes for       If yes for         fish barrier       CAUSE:         Drop too high       Water Drop:       Image: Comparison of the paragement o
If yes for       fish barrier       CAUSE:       greater stream blocking the upstream movement of anadromous fish; no fish passage device present.       significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.         Other:       5       4       3       2       1
Drop too high       Water Drop:       C       (in)       anadromous fish; no fish passage device present.       interfere with the migration of above it; natural barriers such as waterfalls.         Other:       5       4       3       2       1         NOTES/SKETCH:       5       4       3       2       1
$\square \text{ Other:} \qquad 5 \qquad 4 \qquad 3 \qquad 2 \qquad 1$ NOTES/SKETCH:
NOTES/SKETCH:
m i Mart Vin
Old Rost Rd

Reach Level Assessment RCH

SURVEY REACH	Ш: <u>СВ-6</u> WTF	ashd/Subshd:	mars Al	DATE: 6 / 4	ASSE	SSED BY:
START     TIM       Lat 41 ° 5/ '     '       Description:     '	16: <u>3</u> : <u>00</u> AM/RM 51.5" LONG 74 Fhate 1776	LMK: • 25 • 02.5"	END TIME: LAT 05 ' DESCRIPTION:	and the second s	LMK: 20 20, 3	GPS ID:
RAIN IN LAST 24 HO	DURS 🗆 Heavy rain	□ Steady rain □ Trace	PRESENT CONDITIONS	□ Heavy rain □ Trace	□ Steady rain □ Overcast	☐ Intermittent ☐ Partly cloudy
SURROUNDING LAN	DUSE: Industrial		□ Urban/Residential □ Crop	Suburban/Res □ Pasture	☐ Forested □ Other:	□ Institutional
AVERAGI	E CONDITIONS (check	k applicable)	REACH	SKETCH AND SIT	FE IMPACT TR	ACKING
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	Ø 50%-75% □ 75-100%	within the survey re	of survey reach. Tra ach (OT, ER, IB,SC, deemed appropriate.	UT, TR, MI) as we	Ds for all site impacts ell as any additional n of flow
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5)	slick) 🗹 Col 🖾 Bor	bble (2.5 –10") alder (>10") l rock	p	A		IB IB JB IB
	Clear □Turbid aturally colored) □ ( dyes)					Denor period and and
AQUATIC PLANTS IN STREAM	Attached: 🗹 none Floating: 🗹 none			÷\$2-3	und	ing 2
WILDLIFE IN OR AROUND STREAM	(Eyidence of) ☑ Fish □ Beaver □ Snails □ Other:					
STREAM SHADING (water surface)	☑ Mostly shaded (≥ □ Halfway (≥50%) □ Partially shaded □ Unshaded (< 25%	(≥25%)	ERI			(0)
CHANNEL DYNAMICS	Downcutting Widening Headcutting Aggrading	Bed scour Bank failure Bank scour Slope failure				
CHANNEL	Sed. deposition Height: LT bank	Channelized	Chi Rive	t materiale South C	ER	4
<b>DIMENSIONS</b> (FACING DOWNSTREAM)	RT bank Width: Bottom Top	(ft) (ft) (ft)				
F	REACH ACCESSIBILITY				1 6	M.CORUNG
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using	developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas	Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/or located a great distance from stream. Specialized heavy	Oto bed 07-39 P	i-i aftor-i	EK-3	Daen Smeller
existing roads or trails.		equipment required.	Surface disch	ensemmenenensemmenenen) ta KSGC	YA	A
	blem you see in survey re	each)				

**REPORTED TO AUTHORITIES** YES NO

<	Optimal	Suboptimal	Marginal	Poor		
HABITAT         favorable for epifaunal colonization and fish cover; mix of snags, submerged         suite ade           (May modify criteria based on appropriate         favorable for epifaunal colonization and fish cover; mix of snags, submerged         suite ade           (May modify criteria based on appropriate         togs, undercut banks, cobble or other stable habitat and at stage to allow full         sub- pop		40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.		
	20 19 18 17 16	15 14 /13 12 11	10 9 8 7 6	5 4 3 2 1 0		
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
	Left Bank 10 9	8 7 6	65 4 3	2 1 0		
	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0		
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.		
	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.		
	20 19 18 17 16	15 14 13 12 11	10 9 8 (7)6	5 4 3 2 1 0		
		ALL BUFFER AND FLOODPLA	N C'ONDITION			
	Optimal	Suboptimal	Marginal	Poor		
VEGETATED BUFFER WIDTH	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.		
	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	78 7 6	5 4 3	2 1 0		
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land		
	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0		
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water		
	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0		
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function		

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Storm	Water	Outfalls

OT	
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WATERSHED/SUBS	HED: Gogue	BK	DATE: <u>614</u> 108	ASSESSED BY:	7783				
SURVEY REACH II	<u> </u>	ME: 3 : 00 AM/PM	Рното ID: (Camera-Pic	· #) /#	1776				
SITE ID (Condition-#		т <u>ЧГо 51 і 51.7 "</u> І	ONG 720 25 '02.5"	LMK	GPS: (Unit ID)				
BANK: LT XRT Heat FLOW: None Tric	Closed	MATERIAL: Concrete Metal PVC/Plastic Brick Other:	SHAPE: Single Circular Double Elliptical Triple Other:	DIMENSIONS: Diameter: <u>12-(ir</u>	SUBMERGED:				
Moderate Substantial	Dpen channel	Concrete Earthen	Parabolic Wi	pth: <u>(in)</u> dth (Top): <u>(in)</u> (Bottom): <u>(in)</u>	NOT APPESCABLE				
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: 🖾 NO Gas Rancid/Sour Sulfide Other:	DEPOSITS/STAINS:	VEGGIE DENSITY: None Normal Inhibited Excessive Other:	PIPE BENTHIC GR Brown Oran Other: POOL QUALITY: Good Odors Suds Algae Other:	nge 🗌 Green 🗌 No pool 🔲 Colors 🔤 Oils 🗋 Floatables				
FOR       COLOR:       Clear       Brown       Grey       Yellow       Green       Orange       Red       Other:         FLOWING ONLY       TURBIDITY:       None       Slight Cloudiness       Cloudy       Opaque         FLOATABLES:       None       Sewage (toilet paper, etc.)       Petroleum (oil sheen)       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation         CONCERNS:       Needs Regular Maintenance       Bank Erosion       Other:									
POTENTIAL RESTORATION CANDIDATE       Discharge investigation       Stream daylighting       Local stream repair/outfall stabilization         If yes for daylighting:       If yes for daylighting:       Storm water retrofit       Other:									
Length of vegetative cover from outfall:       ft       Type of existing vegetation:       Slope:       •         If yes for stormwater:       Is stormwater currently controlled?       Land Use description:       •         Yes X No       No       Not investigated       Area available:									
OUTFALL SEVERITY: (circle #)	Heavy discharge with a dist strong smell. The amount o compared to the amount of stream; discharge appears significant impact downstrea	f discharge is significant normal flow in receiving to be having a am.	discharge; flow mostly clear and odo rge has a color and/or odor, the amo rge is very small compared to the str nd any impact appears to be minor / I	eam's base localized.	es not have dry weather staining; or appearance any erosion problems.				
SKETCH/NOTES:	5	4	3	2	1				
)	embornd of - CE		07-01 108-1 Re	EPORTED TO AUTHOR	TIES: YES NO				
		121		•					

				Sto	orm Water	Outfalls	ΟΤ
WATERSHED/SUBSHE	D: GAGES	BC		DATE: <u>6 / 4 /0</u>	S Asse	SSED BY:	
SURVEY REACH ID:	FB-06	TIME: <u>3</u> :00 AM/PI	M	Рното ID: (Camera-F	Pic #)	1# 17	76
SITE ID (Condition-#): C	DT- <u>01</u>	LAT 410 51 51	<u>. 7</u> " Lon	16 72º 25 02.5	" LMK	G	PS: (Unit ID)
BANK: LT RT Head FLOW: None Trickle	Closed PVC/Plastic		]Metal ]Brick				SUBMERGED:
Moderate Substantial	Dpen channel	Concrete E E	arthen		Depth: Width (Top): " (Bottom):		NOT APPEICABLE
CONDITION:       ODOR: IN NO         None       Gas         Chip/Cracked       Sewage         Peeling Paint       Rancid/Sour         Corrosion       Sulfide         Other:       Other:		∕⊠ None □Oily		VEGGIE DENSITY:	PIPE BEN		TH: 🕅 None
		Paint Other:		Inhibited Excessive Other:	POOL QUALITY: No pool Good Odors Colors G Suds Algae Floatables Other: Sedment		Colors Oils Floatables
CONCERNS: Nee POTENTIAL RESTORA	ds Regular Mai	······································			Local stre	eam repair/out	fall stabilization
If yes for daylighting: Length of vegetative cov If yes for stormwater: Is stormwater currently c	ontrolled?		of existin Use descr		2 hore o	Slope:	o
Yes       No       Not investigated         OUTFALL       Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is sign: compared to the amount of normal flow in red stream; discharge appears to be having a significant impact downstream.		a distinct color and/or a unt of discharge is significant nt of normal flow in receiving ears to be having a	discharge discharge	vailable: wey owned Small discharge; flow mostly clear and odorles discharge has a color and/or odor, the amount of discharge is very small compared to the stream flow and any impact appears to be minor / local		nt of discharge; staining; or appearance	
Current Ni ama		5	4	3		2	
SKETCH/NOTES:	embonk 07-02	Privent OT-	01	Road hore reco	& orifi been notherer	alle oppy recently	- Dior - Te
)		H		]	Reported to	O AUTHORITIE	S: 🗌 YES 🔀 NO

				Sto	orm Water	Outfalls	ΟΤ		
WATERSHED/SUB	SHED: Gog	er Bh		DATE: <u>61410</u>	8 Asse	SSED BY:	DRB		
SURVEY REACH I	D: 6-B-06	TIME: 3:00AM/PI	м	Рното ID: (Camera-l	Pic #)	/# /	776		
SITE ID (Condition-	t): <b>OT</b> - <u>02A</u>	LAT 41 º 51 ' 51	<u>.7</u> " Lo	NG <u>72° 25 ' 02.5</u>	_ LMK		GPS: (Unit ID)		
<b>BANK:</b> □LT □RT ☑ He <b>FLOW:</b> ☑ None □ Tric	Closed	MATERIAL: Concrete PVC/Plastic Other:	]Metal ]Brick	SHAPE:   Single     Circular   Doubl     Elliptical   Triple     Other:   Triple		SIONS: r:(in)	SUBMERGED:		
Moderate Substantial Other:	🕅 Open channel	□ Concrete □ E I Other: ASP/IAC			Depth: Width (Top): " (Bottom):		NOT APPEICABLE		
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: K N Gas Sewage Rancid/So Sulfide Other:	DEPOSITS/STAIN           Image: State of the st		VEGGIE DENSITY: None Normal Inhibited Excessive Other:	Brown Other: POOL Qu Good	DALITY:	] No pool ]Colors		
FLOWING ONLY       TURBIDITY:       None       Slight Cloudiness       Cloudy       Opaque         ONLY       FLOATABLES:       None       Sewage (toilet paper, etc.)       Petroleum (oil sheen)       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation         CONCERNS:       Needs Regular Maintenance       Bank Erosion       Other:         POTENTIAL RESTORATION CANDIDATE       Discharge investigation       Stream daylighting       Local stream repair/outfall stabilization         If yes for daylighting:       Storm water retrofit       Other:									
If yes for stormwater:       Is stormwater currently controlled?       Land Use description:       Is stormwater currently controlled?       Is							aining; or appearance		
SKETCH/NOTES:		5 normaline ord	4	3		2			
)		EBAD			REPORTED TO	O AUTHORITI	ES: YES NO		

Savara	Rank	Erosion	
Oevele.	Dalik	CIUSIUII	

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	A					
WATERSHED/SUBS				DATE: <u>6</u> / <u>4</u>	_/_ <u>0</u> % Asse:	SSED BY: JHW
SURVEY REACH:		al commune communes	<u>15 AM/PM)</u>	<b>РНОТО ID</b> (САМ	ERA-PIC#): F+(	) /# /3-81
SITE ID: (Condition-	#) START LAT 4	051 .50.2	" LONG <u>2°2</u>	4 1 55.8 11	LMK	GPS: (Unit ID)
ER	END LAT	<u>•51 •54.7</u>	" LONG <u>72_° 2</u>	<u>' 54.7"</u>	LMK	
PROCESS:	Currently unknown	BANK OF CO		RT Both ( <i>la</i>	oking downstroom	-)
Downcutting	Bed scour			$\Box$ Straight section		
Widening	Bank failure	DIMENSIONS				
Headcutting	Bank scour	Length (if no (	<i>GPS</i> ) LTf	and/or RT	ft Botto	om width <u>10</u> ft
Aggrading	Slope failure	Bank Ht		and/or RT		width <u>30</u> ft
Sed. deposition	Channelized	Bank Angle	LT <u>50</u>	and/or RT_30	° Wett	ed Width <u>8</u> ft
LAND OWNERSHIP	r: 🕅 Private 🔲 Public	Unknown	LAND COVER	: 🕅 Forest 🔲 F	ield/Ag 🗌 Deve	eloped:
POTENTIAL REST	ORATION CANDIDATE	: Grade	a control	Bank stabilization	979	
No No		Other	-	_ Dank Stabilization		
THREAT TO PROP	ERTY/INFRASTRUCTU		Yes (Describ	e):		
EXISTING RIPARIA	AN WIDTH:		25 - 50 ft	🕈 50-75ft 🔲 75-	100ft 🗌 >100	ft
EROSION SEVERITY(circle#)	Active downcutting; tall banks on both sides of the stream eroding at a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure					
Channelized= 1	infrastructure. 5					
ACCESS:	Good access: Open area in ownership, sufficient room to materials, easy stream chan heavy equipment using exist trails.	n public o stockpile inel access for	Fair access: Foreste adjacent to stream. A removal or impact to I	d or developed area ccess requires tree	other sensitive areas stockpile areas availa	I st cross wetland, steep slope to access stream. Minimal able and/or located a great section. Specialized heavy
NOTES/CROSS SEC	5	4	1 3	)	2	1
	Bo	nd Scould			Joskse Head co	2
)					<b>Reported</b> to Au ⁷	THORITIES 🗌 YES 🗍 Ì

Severe Bank Erosion

WATEDONED (SUD	mp. 6. 17	\		D C , M	, 10		
SURVEY REACH:	SHED: Gayes Bas	тиме: <u>3</u> :	20	DATE: <u>6 / 4</u>			
SITE ID: (Condition-		1 IME: <u>3</u> :	<u>30 AM(PM)</u>	PHOTO ID (CAM)	ERA-PIC #):	0 /# / 784	
	$\frac{START LAT}{END LAT}$		" LONG <u>72°2</u> " LONG <u>72°2</u>	. 50,8.		GPS: (Unit ID)	
<u> </u>	<u>END</u> LAT		" LONG <u>* L</u> ° <u>L</u>	<u>Y (0,9</u>	LMK		
PROCESS:	Currently unknown Bed scour Bank failure Bank scour Slope failure	LOCATION:   DIMENSIONS	Meander bend   : : : : : : : : : : : : : : : : : : :	ART Both ( <i>lo</i> ) Straight section and/or RT and/or RT	Steep slope/val		
Sed. deposition	Channelized	Bank Angle	LT_45 0	and/or RT	° Wett	ed Widthft	
	P: APrivate D Public	unknown	13	Forest Fi			
POTENTIAL RESTO	ORATION CANDIDATE	C: Grade		A Bank stabilization	······································		
THREAT TO PROP	ERTY/INFRASTRUCT	URE: 🕅 No	Yes (Describ	e):			
EXISTING RIPARIA	AN WIDTH:	<b>⊠</b> ≤25 ft	25 - 50 ft	] 50-75ft   75-3	100ft 🗌 >100	ft	
EROSION SEVERITY(circle#)	Active downcutting; tall ban of the stream eroding at a fa contributing significant amo stream; obvious threat to pr infrastructure.	ast rate; erosion unt of sediment to	Pat downcutting evide widening, banks active moderate rate; no thre infrastructure	ely eroding at a	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.		
Channelized= 1	5		4 3	)2	2	1	
Access:	Good access: Open area in ownership, sufficient room t materials, easy stream char heavy equipment using exis trails.	o stockpile nnel access for	Fair access: Forestee adjacent to stream. Ac removal or impact to la Stockpile areas small	ccess requires tree andscaped areas.	other sensitive areas stockpile areas availa	ifficult access. Must cross wetland, steep slope or ther sensitive areas to access stream. Minimal tockpile areas available and/or located a great istance from stream section. Specialized heavy quimment required	
	5	4	3	2		1	
NOTES/CROSS SEC	CTION SKETCH:						
)	APPROXIMATION OF A				REPORTED TO AUT	THORITIES 🗌 YES 🗌 NO	

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				S	evere Bi	ank Erosion	ER
WATERSHED/SUBS	shed: Goges	18k		Date: <u>61</u> <u>4</u>	108	ASSESSED BY:	DEB
SURVEY REACH:	G-B-06	Time: <u>3</u> :	MSAM/PM	<b>РНОТО ID</b> (САМ	ERA-PIC #	+): DBG1/# /	765:786
SITE ID: (Condition-	#) START LAT	1051 148,4	" LONG 77_°2	<u>+ '48.8''</u>	LMK	GPS:	(Unit ID)
ER- <u>03</u>	END LAT_		" Long°		LMK		
<ul> <li>Downcutting</li> <li>Widening</li> <li>Headcutting</li> <li>Aggrading</li> <li>Sed. deposition</li> </ul>	Currently unknown Bed scour Bank failure Bank scour Slope failure Channelized	LOCATION: DIMENSIONS Length (if no C Bank Ht Bank Angle	□ Meander bend :: <i>GPS</i> ) LT ○ ft LT <u></u> ft LT <u></u> <del>[</del>	RT Both ( <i>la</i> Straight section and/or RT <u>30</u> and/or RT <u>30</u> and/or RT <u>30</u>	C Steep s	Bottom width Top width Wetted Width	ft ft
LANDOWNERSHI			LANDCOVER		ieid/Ag	Developed:	
🗌 No	ORATION CANDIDATE	🛛 🔀 Other		Bank stabilization			
EXISTING RIPARIA		<i></i>		_] 50-75ft	100ft	⊠ >100ft	
EROSION SEVERITY(circle#) Channelized= 1	Active downcutting; tall ban of the stream eroding at a fa contributing significant amo stream; obvious threat to pr infrastructure.	ist rate; erosion unt of sediment to	Pat downcutting evide widening, banks activ moderate rate; no thre infrastructure	ely eroding at a	failure/eros	width stable; isolated sion; likely caused by a aired riparian vegetati	a pipe outfall, local
ACCESS:	5 Good access: Open area in ownership, sufficient room t materials, easy stream char heavy equipment using exis trails.	n public o stockpile anel access for	4 3 Fair access: Forester adjacent to stream. A removal or impact to I Stockpile areas small	d or developed area ccess requires tree	other sens stockpile a	1 ccess. Must cross we itive areas to access s reas available and/or om stream section. S required.	tream. Minimal ocated a great
NOTES/CROSS SEC	5 CTION SKETCH:	CHIDEAM	1 3 3 70555	AROUND	2)	1	4
	FORMER down FORMER V-Note V-Note SEQUENT SEQUENT	FOTZMIN	IG NEW	A KOUND C M ANNEL	FORM F. FORM	EIZ DA M H	a eighn 2 J
)					Reporte	D TO AUTHORITIE	s 🗌 Yes 🗌 No

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				Se	evere B	ank Ero	sion	ER
WATERSHED/SUBS	SHED: (Jogh	a Bh		DATE: 61 U	108	ASSESS	ED BY:	DBB
SURVEY REACH:		Тіме: <u> </u>	<u>)()</u> am/pm	РНОТО ID (САМ	ERA-PIC #	¥):	/#	187
SITE ID: (Condition-	CONSCIENCE AND A		LONG <u>72° 2</u>		LMK		GPS: (U	
ER- <u>04</u>	Reversion -		Long 72 • 2	· · · · · · · · · · · · · · · · · · ·	LMK			,
PROCESS:	Currently unknown			RT Both ( <i>lc</i> ) Straight section			y wall [	] Other:
Widening	Bank failure	DIMENSIONS:		<b>A</b>				
K Headcutting	Bank scour			and/or RT_22	ξ			<u> </u>
Aggrading	Slope failure	Bank Ht		and/or RT				<u> </u>
Sed. deposition	Channelized	Bank Angle	LT <u>80-90</u>	and/or RT_80	<u>90</u> °	Wetted	Width	<u>6</u> ft
LAND OWNERSHIP	Private 🗌 Public	Unknown	LAND COVER	Forest Fi	eld/Ag	🔀 Develo	ped:	
POTENTIAL RESTO	DRATION CANDIDATE	: 🔀 Grade	control	Bank stabilization		<u>, er (1997)</u>		
THREAT TO PROP	ERTY/INFRASTRUCTI	JRE: 📉 No	Yes (Descrit	e):				
EXISTING RIPARIA	N WIDTH:	□ ≤25 ft	🔀 25 - 50 ft [	] 50-75ft	100ft	□ >100ft		
EROSION SEVERITY(circle#)	Active downcutting; tall ban of the stream eroding at a fa contributing significant amo stream; obvious threat to pr	ast rate; erosion unt of sediment to	Pat downcutting evide widening, banks activ moderate rate; no thr	ely eroding at a	failure/eros		used by a	reas of bank pipe outfall, local n or adjacent use.
Channelized= 🔀 1	infrastructure.		infrastructure				vegetation	r or aujacent use.
ACCESS:	5 Good access: Open area in ownership, sufficient room t materials, easy stream char heavy equipment using exis trails.	n public o stockpile anel access for	3 Fair access: Forester adjacent to stream. A removal or impact to I Stockpile areas small	d or developed area	other sens stockpile a	itive areas to reas availabl om stream se	access str e and/or lo	and, steep slope or eam. Minimal cated a great ecialized heavy
	5	4	3	2	2		1	
NOTES/CROSS SEC Documents SIG H	ILL	A A M	Some mace	X X	A TOD			
)					Reporte	D TO AUTH	ORITIES	Yes No

						Impact	ted Buffe	er <b>IB</b>	
WATERSHED/SUBSHED:	Gaes				DATE:	610103	ASSES	SSED BY: $\angle M$	
JRVEY REACH: AB	-01		TIME: <u>4</u>	_: <u>25_</u> AM/PM)	Рнотс	DID: (Camera-P	ic #) 💦		
SITE ID: (Condition-#)	<u> </u>	ат <u>41_°51</u>	<u>'52.\</u> " I	LONG <u>72</u> °24				GPS: (Unit ID)	
<b>IB</b>				LONG <u>72 ° 2 4</u>					
IMPACTED BANK:		ADEQUATE:	Recently	/ planted 🗌 Oth	o narrow her: <u>en (</u> ther Publi	Widespread in	ivasive pla fcml	nts andscripe	
(Facing downstream) LT Bat	1					-			
RT Bar DOMINANT	nk 🗹 Paved	Bare ground	Turf/lav				0.1		
LAND COVER: LT Ba RT Ba	nk 🗌					crub Trees	Other		
INVASIVE PLANTS:	🗌 None		P	artial coverage	Ū.Ext	tensive coverage	unkno	own	
STREAM SHADE PROVIL	DED? 🗌 Non	e 🗹 Part	ial 🗌	Full WETL	ands Pr	ESENT? No	🗌 Yes	Unknown	
POTENTIAL RESTORATI	ON CANDIDA			ion 🗌 Greenway o stabilizatio		] Natural regenera	tion 🗌 In	vasives removal	
RESTORABLE AREA Length (ft): <u>150</u> Width (ft): <u>50</u>	к RT 307	<b>REFOREST</b> <b>POTENTIAL</b> ( <i>Circle</i> #)		Impacted area on pu where the riparian ar not appear to be use specific purpose; ple area available for pla	ea does d for any nty of	Impacted area on eith public or private land presently used for a s purpose; available are planting adequate	that is la specific er ea for fe	npacted area on private nd where road; building ncroachment or other eature significantly limits vailable area for planting	<b>)</b>
	<u> </u>			5	4	3	72)	<u> </u>	
POTENTIAL CONFLICTS	with REFOR	ESTATION g impervious c	⊡rWi over □ Sev	despread invasive vere animal impact	plants s (deer, b	Potential contar eaver) D Other:	mination	Lack of sun	7
NOTES:		Ber		inves plot		field		7	

Stream Crossing SC

WATERSHED	SUBSHED: Gogles B	vook.	DA	.TE: 6	14 108	ASSE	SSED BY:	DRB
URVEY REA	сн ID: G-B-86	TIME: <u>3: 30</u>	АМ/РМ РН	ото II	<b>):</b> (Camera-Pi	c#) <u> </u>	1#	1779
SITE ID: (Cond	dition-#) SC- <u>02</u> LAT	<u>41°57 '50.</u>	<u>4" LONG 72°</u>	24	<u>\$8.3</u> " L	MK	GPS	(Unit ID)
TYPE: 🗌 Roa	d Crossing 🔲 Railroad Crossi	ng 👿 Manmade I	Dam 🔲 Beaver D	am 🔲	Geological For	mation	Other:	
For Road/ Railroad	SHAPE:         Arch       Bottomless         Box       Elliptical         Circular       Other:	# BARRELS:	MATERIAL: Concrete Metal Other:	Flc	NMENT: ow-aligned of flow-aligned onot know	Barrel dia	ameter: Height:	ariable, sketch) (ft) (ft)
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	n 🔲 Downstrean		Fla	VERT SLOPE: at ght $(2^{\circ} - 5^{\circ})$ povious $(>5^{\circ})$	Culvert le Roadway	ength: Width:	(ft) (ft) (ft)
POTENTIAL R	RESTORATION CANDIDATE	K Fish barrier re ☐ Local stream r	moval 🗌 Culvert i repair 🔀 Other: 🗧	× ,	placement 🔲 N GEOWSY	· ,	Ų	
IS SC ACTING	G AS GRADE CONTROL	□ No 🛛 Ye	es 🗌 Unknow	'n	¥ 	Ber con		
	EXTENT OF PHYSICAL BLO	CKAGE:	······	BLO	CKAGE SEVE	RITY: (circ	:le #)	
If yes for fish barrier	Flow too shallow Water D	rop: <u>3</u> (in)	A structure such as a c road culvert on a 3rd o greater stream blockin upstream movement o anadromous fish; no fi passage device preser	order or g the f sh	A total fish blocka tributary that wou significant reach or partial blockag interfere with the anadromous fish	Id isolate a of stream, e that may migration of	beaver dam the very hea very little via	y barrier such as a o r a blockage at ad of a stream with able fish habitat tural barriers such s.
<u></u>	Other:		5		4 3		2	1
NOTES/SKET	The per	stock low evel ovale						
Ĺ	· · · · · · · · · · · · · · · · · · ·	and a second			REPOR	<u>TED TO</u> AU	THORITIES	Yes No

Stream	Cros	sing

3	/SUBSHED: Cages		able .	DATE: 6	14108		SED BY: M	
	сн <b>D:</b> 6В-6	TIME: <u>3</u> : <u>1</u> :			<b>):</b> (Camera-Pic	:#) Janavi	<u>/# )779</u>	
SITE ID: (Con	dition-#) SC- <u>62</u> LAT	r <u>ul°61 '30</u>	<u></u>	<u>2°24 !</u>	<u> 58.3</u> " Li	MK	GPS (Unit ID	)
TYPE: 🛃 Roa	ad Crossing 🔲 Railroad Cros	sing 🔲 Manmade	Dam 🔲 Beav	er Dam	Geological Forr	nation 🔲 C	Other:	
For Road/	SHAPE: Arch Bottomless Box Elliptical Circular	# BARRELS:	MATERIAL: Concrete	ALIG Flo	NMENT: ow-aligned of flow-aligned o not know	DIMENSIO Barrel diam	NS: (if variable, s	ketch (
RAILROAD CROSSINGS ONLY	CONDITION: (Evidence of )			/ERT SLOPE:	Culvert len; W	gth: <u>25</u> Vidth: 3	(	
	Cracking/chipping/corrosi						levation: <u>8</u>	
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re		· ·	placement 🔲 (	Jpstream stor	rage retrofit	
IS SC ACTING	G AS GRADE CONTROL		es 🗌 Unk	nown				
	EXTENT OF PHYSICAL BL	OCKAGE:		BLC	CKAGE SEVER	UTY: (circle	#)	
If yes for fish barrier	Temporary Unkn	own Drop: <u>6</u> (in)	A structure such a road culvert on a greater stream bl upstream movem anadromous fish; passage device p	3rd order or ocking the ent of no fish oresent.	A total fish blocka tributary that wou significant reach o or partial blockag interfere with the anadromous fish.	d isolate a f of stream, f e that may migration of f	A temporary barrier s beaver dam or a bloc the very head of a str very little viable fish h above it, natural barri as waterfalls.	kage eam iabita
			nalas mara na sa					
)					Repor	TED TO AUTH	iorities 🗌 Yes	

Stream Crossing SC

WATERSHED	/SUBSHED: Cares			DA	те: <u>6</u>	14108	ASSE	SSED BY:	-2W
JURVEY REA	сн ID: 6В-96	TIME: <u>3</u> :25	_AM/PM	Рн	ото II	<b>):</b> (Camera-Pie	c #) (and	⊮A/#	1777
SITE ID: (Con	dition-#) SC- <u>Ol</u> LAT	41051 151	🕙 " Long	<u>72°</u>	25 !	<u>01.4</u> " L	МК	GPS	(Unit ID)
			-						,
TYPE: 🗌 Roz	ad Crossing 🔲 Railroad Crossi		1						o mid ha ithe
	SHAPE:	# BARRELS:	MATERIAL:			NMENT:			ariable, sketch)
	Box Elliptical	☐ Single ☐ Double	Concrete			ow-aligned ot flow-aligned	Barrel dia		(ft)
FOR ROAD/	Circular	Triple	Other:			not know		Height:	(ft)
RAILROAD CROSSINGS	Other: Undefined	Other: Mone					Culvert le	noth.	(ft)
ONLY	<b>CONDITION:</b> (Evidence of)				CULV	ERT SLOPE:	Current	Width:	(ft)
	Cracking/chipping/corrosion	Downstrean				ght $(2^{\circ} - 5^{\circ})$			
	Other ( <i>describe</i> ):		dikilicit		🗌 Ob	ovious (>5°)	Roadway	elevation:	(ft)
[									
	RESTORATION CANDIDATE	Fish barrier re			epair/re	placement 🔲 I	Upstream st	torage retr	ofit
no		Local stream	repair 🗌 Oth	er:					
IS SC ACTING	G AS GRADE CONTROL		es 🗌 Unk	cnow					
	EXTENT OF PHYSICAL BLO	CKAGE:	<u> </u>		BLO	CKAGE SEVEL	RITY: (circ	le #)	
	Total Partial Temporary Unknow	wn	A structure such			A total fish blocka	0		y barrier such as a
If yes for		road culvert on a 3rd order or greater stream blocking the			tributary that would isolate a significant reach of stream,			n or a blockage at ad of a stream with	
fish barrier	CAUSE:	rop:(in)	upstream moven	nent of	r i	or partial blockag	e that may	very little v	iable fish habitat
	Flow too shallow Water De		anadromous fish passage device			interfere with the anadromous fish.	v	above it; n as waterfal	atural barriers such ls.
)	Other:	( )	5			4 3		2	1
NOTES/SKET	CH:	····	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						
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	The second	· ····	1	and the second sec					
	stream forms	Vegetite					and the second		
	Streem output	regetin	. Not						
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)				•••					

REPORTED TO AUTHORITIES YES NO

Reach Level Assessment

SURVEY REACH ID: <u>GB-07</u> WTRSHD/SUBSHD:	DATE: $\underline{6} \underline{4} \underline{5} $ Assessed by:
START TIME: 4 : 52 AM/PM LMK:	END TIME: AM/PM LMK: GPS ID:
LAT 41 05 151.9 " LONG 22 024 131.0"	LAT <u>41 ° 51 ' 530 " LONG 72 ° 24 ' 21 1 "</u>
DESCRIPTION:	DESCRIPTION:
RAIN IN LAST 24 HOURS       Heavy rain       Steady rain         None       Intermittent       Trace	PRESENT CONDITIONS Heavy rain Steady rain Intermittent
SURROUNDING LAND USE:  Industrial Commercial	□ Clear □ Trace □ Overcast □ Partly cloudy □ Urban/Residential □ Suburban/Res □ Forested □ Institutional
$\Box \text{ Golf course } \Box \text{ Park}$	□ Urban/Residential □/Suburban/Res □ Forested □ Institutional □ Crop □ Pasture □ Other:
AVERAGE CONDITIONS (check applicable)	REACH SKETCH AND SITE IMPACT TRACKING
<b>BASE FLOW AS %</b> □ 0-25% ☑ 50%-75%	Simple planar sketch of survey reach. Track locations and IDs for all site impacts
CHANNEL WIDTH         25-50 %         75-100%	within the survey reach (OT, ER, IB,SC, UT, TR, MI) as well as any additional features deemed appropriate. Indicate direction of flow
DOMINANT SUBSTRATE         □ Silt/clay (fine or slick)       □/Cobble (2.5 -10")         □ Sand (gritty)       □/Boulder (>10")         □ Gravel (0.1-2.5")       □ Bed rock	
WATER CLARITY Clear Turbid (suspended matter) Stained (clear, naturally colored) Opaque (milky) Other (chemicals, dyes)	A Bleen Z
AQUATIC PLANTS       Attached: ☑ none □ some □ lots         IN STREAM       Floating: ☑ none □ some □ lots	
WILDLIFE IN OR       (Evidence of)         AROUND STREAM       □ Fish       □ Beaver       ☑ Deer         Spails       □ Other:	Marken and M
STREAM SHADING (water surface) $\Box$ /Mostly shaded ( $\geq$ 75% coverage) $\Box$ Halfway ( $\geq$ 50%) $\Box$ Partially shaded ( $\geq$ 25%) $\Box$ Unshaded (< 25%)	JB JB
CHANNEL Downcutting Bed scour	
DYNAMICS Widening Bank failure	
Unknown       Headcutting       Bank scour         Aggrading       Slope failure         Sed. deposition       Channelized	
CHANNEL Height: LT bank(ft)	erosion
DIMENSIONS RT bank(ft)	Car.
(FACING Width: Bottom(ft)	
Top <u>12-5</u> (ft)	
REACH ACCESSIBILITY	
Good: Open area in developed area wetland, steep slope, or	
sufficient room to adjacent to stream. sensitive areas to get to	
stockpile materials, Access requires tree stream. Few areas to	
access for heavy landscaped areas. and/or located a great	
equipment using small or distant from Specialized heavy	
existing roads or trails. Stream. equipment required.	
NOTES: (biggest problem you see in survey reach)	1
)	
	<b>Reported to authorities</b> Yes No

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	Optimal	Suboptimal	Marginal	Poor		
N-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags		Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.		
	20 19 18 17 16	15 14 /13 /12 11	10 9 8 7 6	5 4 3 2 1 0		
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected. Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.		Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.		
	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
FLOODPLAIN	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.		
	20 19 18 17 16 OVER	15 14 13 12 11 ALL BUFFER AND FLOODPLAI	10 9 8 7 6	5 4 3 2 1 0		
VEGETATED Buffer Width	Optimal Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Suboptimal Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Marginal Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Poor Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.		
	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	<u>5</u> <u>4</u> <u>3</u>	2 1 0		
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land		
	20 19 18 17 16	5 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		

mpauco sunce	Impacted	Buffer
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JRVEY REACH:       GB 0 7       TIME: S: 0 AM/PW       PHOTO ID: (Camera-Pic #) Common /# 75         SITE ID: (Condition:#)       START       LAT 0 150 1515"       LONG 32 024 152"       LMK	WATERSHED/SUBSHED:	es RV		DATE: 1 1 108 AS	SSESSED BY: $\mathcal{H} \omega$
STEE ID: (Condition-#)       START       LAT       \$1. \$51. \$51. \$51. \$71. \$100. \$21. \$21. \$100. \$21. \$21. \$21. \$21. \$21. \$21. \$21. \$21			: 00 AM/PM		
B-       END       LAT       * ''       LONG       * ''       LMK         IMPACTED BANK:       REASON INADEQUATE:       Lack of vegetation       Too narrow       Widespread invasive plants         BLT       GRT       Both       Recently planted       Other:         IAND USE:       Private       Institutional       Golf Course       Park       Other Public         (Facting downstream)       LT Bank			I	1/1.8" IMK	GPS: (Unit ID)
IMPACTED BANK:       Reason INADEQUATE:       Lack of vegetation       Too narrow       Widespread invasive plants         QLT       Institutional       Golf Course       Park       Other:         LAND USE:       Private       Institutional       Golf Course       Park       Other Public         (Facing downstream)       LT Bank       Institutional       Golf Course       Park       Other       Institutional         DoMINANT       Paved       Bare ground       Turf/lawn       Tall grass       Shrub/sorub       Trees       Other         LAND Cover:       LT Bank       Institutional       Golf Course       Extensive coverage       unknown         INVASIVE PLANTS:       None       Rare       Partial       Full       WETLANDS PRESENT?       No       Yes       Unknown         STREAM SHADE PROVIDED?       None       Partial       Full       WETLANDS PRESENT?       No       Yes       Unknown         POTENTIAL       REFORESTATION       Greenway design       Matural regeneration       Invasives removal       Invasives removal       Invasives removal       Ind where road; building presently used for as specific purpose; plent of as appeadie for planting       Impacted area on pitter fuel and hatch if feature sofpring of as available area for planting       Ind where road; building presently used for a					
Impacted area on public and invasive plants         Impacted area on public area on plants         Impacted area on plants         Impacts (deer, beaver)         Impacts (deer, beaver)         Impacts (deer, beaver)         Impacts (de					
(Facing downstream)       LT Bank	LALT A RT Both Recently planted Other:				
RT Bank       Image: Shrub/serub       Image: Shrub/serub       Trees       Other         LAND COVER:       LT Bank       Image: Shrub/serub       Image: Shrub       Image: Shrub/seru		nstitutional Golf Cou	rse Park Ot	her Public	
DOMINANT       Paved       Bare ground       Turflawn       Tall grass       Shrub/sorub       Trees       Other         LAND COVER:       LT Bank					
LAND COVER:       LT Bank       Image: Strate of the strate of th		Bare ground Turf/low		Shruh/aaruh Trees Othe	
RT Bank       Image: Packagenetical coverage       Extensive coverage       Inknown         INVASIVE PLANTS:       None       Rare       Partial coverage       Extensive coverage       Inknown         STREAM SHADE PROVIDED?       None       Partial       Full       WETLANDS PRESENT?       No       Yes       Unknown         POTENTIAL RESTORATION CANDIDATE       Active reforestation       Greenway design       Natural regeneration       Invasives removal         Ino       Other:       Impacted area on public land where the fiparian area does not appear to be used for any specific purpose; pelity of a specific purpose; pelity of area available for planting       Impacted area on either public or private land that is presently used for aspecific purpose; pelity of area available for planting       Impacted area on pitvate land that is presently used for aspecific purpose; pelity of area available for planting adequate       Impacted area on pitvate land that is presently used for aspecific purpose; pelity of area available for planting adequate       Impacted area on pitvate land that is presently used for aspecific purpose; pelity of area available for planting adequate       Impacted area on public land       Impacted area for planting         "width (ft):       2.5       2.5       Impacted invasive plants       Potential contamination       Lack of sun         POOTENTIAL CONFLICTS WITH REFORESTATION       Widespread invasive plants       Potential contamination       Lack of sun         Poor/un					
INVASIVE PLANTS:       None       Rare       Partial coverage       Extensive coverage       unknown         STREAM SHADE PROVIDED?       None       Partial       Full       WETLANDS PRESENT?       No       Yes       Unknown         POTENTIAL RESTORATION CANDIDATE       Active reforestation       Greenway design       Natural regeneration       Invasives removal         no       Other:       Impacted area on public land where the riparian area does not appear to be used for any specific purpose; plenty of area available for planting       Impacted area on private land that is presently used for a specific purpose; plenty of area available for planting       Impacted area on private land that is presently used for a specific purpose; plenty of area available for planting       Impacted area on private land that is presently used for a specific purpose; plenty of area available for planting       Impacted area on private land that is presently used for a specific purpose; plenty of area available for planting       Impacted area for planting         "Width (ft):       2.5       2.5       4       3       2       1         POTENTIAL CONFLICTS WITH REFORESTATION       Widespread invasive plants       Potential contamination       Lack of sun         Poor/unsafe access to site       Existing impervious cover       Severe animal impacts (deer, beaver)       Other:         NOTES:       Videspread invasive plants       Potential contamination       Lack of sun					
POTENTIAL RESTORATION CANDIDATE       Active reforestation       Greenway design       Natural regeneration       Invasives removal         no       Other:         RESTORABLE AREA       Impacted area on public land where the riparian area does not appear to be used for any specific purpose; plenty of area available for planting       Impacted area on private land that is presently used for a specific purpose; available area for planting adequate       Impacted area on private land that is presently used for a specific purpose; available area for planting       Impacted area on private land that is presently used for a specific purpose; plenty of area available for planting adequate       Impacted area on private land that is presently used for a specific purpose; plenty of area available for planting adequate       Impacted area on private land that is presently used for a specific purpose; plenty of area available for planting adequate       Impacted area on private land that is presently used for a specific purpose; plenty of area available for planting adequate       Impacted area on private land that is presently used for a specific purpose; plenty of area available for planting adequate       Impacted area on plivate land that is presently used for a specific purpose; plenty of area available for planting adequate       Impacted area on plivate land that is presently used for a specific purpose; plenty of area available area for planting         POTENTIAL CONFLICTS WITH REFORESTATION       Impacted area on private land that is presently used for a specific purpose; plenty of area available area for planting       Impacted area on plivate land that is presently used for a specific purpose; plenty of area available for planting adequate	INVASIVE PLANTS: None	🗌 Rare 🕅 🏹 P	artial coverage		÷
Image: Construction of the construc	STREAM SHADE PROVIDED?	e 🖾 Partial 🗌	Full WETLA	ANDS PRESENT?	Yes 🔲 Unknown
Image: Construction of the construc	Domption Design				1
Restorable AREA       Impacted area on public land where the riparian area does not appear to be used for any specific purpose; plenty of area available for planting       Impacted area on either public or private land that is presently used for a specific purpose; available area for planting       Impacted area on private land that is presently used for a specific purpose; plenty of area available for planting       Impacted area on private land that is presently used for a specific purpose; available area for planting       Impacted area on private land that is presently used for a specific purpose; available area for planting       Impacted area on private land that is presently used for a specific purpose; available area for planting       Impacted area on private land that is presently used for a specific purpose; available area for planting       Impacted area on private land that is presently used for a specific purpose; plenty of area available for planting       Impacted area on private land that is presently used for a specific purpose; available area for planting       Impacted area on private land that is presently used for a specific purpose; plenty of area available for planting       Impacted area on private land that is presently used for a specific purpose; available area for planting         POTENTIAL CONFLICTS WITH REFORESTATION       Widespread invasive plants       Potential contamination       Lack of sun         Poor/unsafe access to site       Existing impervious cover       Severe animal impacts (deer, beaver)       Other:         NOTES:			on []Greenway d	esign Matural regeneration	Invasives removal
Length (ft):		U Otner:		· · · · · · · · · · · · · · · · · · ·	1
Width (ft):       25       25       (Circle #)       area available for planting       planting adequate       available area for planting         POTENTIAL CONFLICTS WITH REFORESTATION       State       Widespread invasive plants       Potential contamination       Lack of sun         Poor/unsafe access to site       Existing impervious cover       Severe animal impacts (deer, beaver)       Other:         NOTES:       Image: Control of the state       Image: Control of the state       Image: Control of the state	LT BANK RT	POTENTIAL:	where the riparian are not appear to be used	ea does public or private land that is for any presently used for a specific	land where road; building encroachment or other
POTENTIAL CONFLICTS WITH REFORESTATION UNdespread invasive plants Potential contamination Lack of sun Context Severe animal impacts (deer, beaver) Other:	Width (ft): <u>25</u> <u>25</u>	(Circle #)	area available for plar	nting planting adequate	available area for planting
NOTES:			despread invasive	plants	
			T		
	<u>)</u>				

Stream	Cross	sin

							Stre	am Cros	ssing SC
WATERSHED	SUBSHED:	Goges	Rh		DA	TE: 6	14 108	ASSE	ESSED BY: DPR
URVEY REA		-07	TIME: 5:00	AMPM			: (Camera-Pi		
SITE ID: (Con	Server and a state of the products		91051:53	U" LONG Z				MK	GPS (Unit ID)
TYPE: 🔀 Roa	ad Crossing [	] Railroad Cross	ing 🗌 Manmade	Dam 🗌 Beav	er Da	am 🔲	Geological Fori	nation 🔲	Other:
FOR ROAD/ RAILROAD CROSSINGS ONLY	Cracking/c	Bottomless Elliptical				<ul> <li>➢ Flo</li> <li>□ No</li> <li>□ Do</li> <li>CULV</li> <li>□ Fla</li> </ul>	NMENT: w-aligned t flow-aligned not know ERT SLOPE: t ght (2° – 5 ⁰ )	Barrel dia	Height:(ft)
	Sediment	deposition scribe):	Failing emb	ankment			vious (>5°)	Roadway	elevation: $301$ (ft)
POTENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         Image: Marrier definition of the construction of t									
IS SC ACTING	G AS GRADE (	Control	No Y	es 🗌 Unl	now	n			
	EXTENT OF	PHYSICAL BLO	OCKAGE:	r		BLO	CKAGE SEVEI	RITY: (circ	cle #)
If yes for fish barrier		• • •	rop: <u>1</u> (in)	A structure such road culvert on a greater stream b upstream mover anadromous fish passage device	a 3rd or locking nent of a; no fis	der or the	A total fish blocka tributary that wou significant reach or partial blockag interfere with the anadromous fish.	ld isolate a of stream, e that may migration of	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.
<u></u>	Other:			5		4	4 3	(	2 1
NOTES/SKET	. *	2017		thou	\$1. 		Brugh	Jones (	2 when out ??
	How	54		, IS	5	NOV N			<b>THORITIES</b> TYES NO

Reach Level Assessment RCH

SURVEY REACH ID: $GB-3$ WTRSHD/SUBSHD: $G_{a}$	225	DATE: <u>6 / 5</u>		ESSED BY:
START TIME: 55 AMPM LMK: 0	END TIME:	7:25 AM/PM	LMK:	GPS ID:
LAT	LAT 41 0 51 19	15.5" Long 7	• <u>9</u> 1111	77 11
DESCRIPTION:	DESCRIPTION:			
RAIN IN LAST 24 HOURS 🗆 Heavy rain 🔅 Steady rain	PRESENT CONDITIONS	□ Heavy rain	□ Steady rain	Intermittent
□ None □ Intermittent □ Trace	□ Clear		☑ Overcast	$\Box$ Partly cloudy
SURROUNDING LAND USE:  Industrial Commercia	Urban/Residential			
□ Golf course □ Park		□ Pasture	□ Other:	
AVERAGE CONDITIONS (check applicable)	REACH S	SKETCH AND SIT	Е ІМРАСТ ТІ	ACKING
BASE FLOW AS % 🗆 0-25% 🖾 50%-75%	Simple planar sketch o	of survey reach. Tra	ck locations and .	IDs for all site impacts
Channel Width □25-50 % □ 75-100%	within the survey rea	ich (OT, ER, IB,SC,	UT, TR, MI) as w	ell as any additional
DOMINANT SUBSTRATE         □ Silt/clay (fine or slick)       □ Cobble (2.5 -10")         ☑ Sand (gritty)       □ Boulder (>10")         ☑ Gravel (0.1-2.5")       □ Bed rock	p () equives a	deemed appropriate.	Inaicate atrectio	n of flow
WATER CLARITY In Clear Turbid (suspended matter) Stained (clear, naturally colored) Opaque (milky) Other (chemicals, dyes)				
AQUATIC PLANTSAttached: In one is some is lotsIN STREAMFloating: In one is some is lots	07-20			
WILDLIFE IN OR AROUND STREAM (Evidence of) □ Fish □ Beaver □ Deer □ Snails □ Other:	TRIP			
STREAM SHADING (water surface) $\checkmark$ Mostly shaded ( $\geq$ 75% coverage)I Halfway ( $\geq$ 50%)I Partially shaded ( $\geq$ 25%)I Unshaded (< 25%)		2		
CHANNEL       Downcutting       Bed scour         DYNAMICS       Widening       Bank failure         Headcutting       Bank scour         Aggrading       Slope failure         Sed. deposition       Channelized	rahud A			
CHANNEL Height: LT bank (ft) DIMENSIONS RT bank (ft)			( po	nd
(FACINC T		1. vm	l l	
DOWNSTREAM) WIGHT. Bottom(ff)		ST=1 ?	-	
REACH ACCESSIBILITY	- reveal most	(-LB-)	_la	
bublic ownorship developed area wetland, steep slope, or		)		
sufficient room to adjacent to stream. sensitive areas to get to		L	56-10	
stockpile materials, conviction definition of the stockpile materials, removal or impact to		2007), U		
access for beauty landscaped areas. and/or located a great	101	a grant day of homeses, the spirity file (second above) as the		
equipment using Stockpile areas distance from stream.	Dada .	art i		
existing roads of trails. stream. equipment required.	Andrews	<u>ver</u>	A)	9
<u>5</u> <u>4</u> <u>3</u> <u>(2)</u> <u>1</u>		-		·
NOTES: (biggest problem you see in survey reach)				
/				
		REPORT	ED TO AUTHOR	ITIES YES NO

	Optimal	Suboptimal	Marginal	Poor	
N-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).		Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.	
	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	
	20 19 18 17 16 OVER	15 14 13 12 11 ALL BUFFER AND FLOODPLAI	10 9 8 7 6	5 4 3 2 1 0	
	Optimal	Suboptimal		<b>n</b>	
Vegetated Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Marginal Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Poor Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.	
	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest Field		Predominant floodplain vegetation type is turf or crop land	
	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	bitats, no evidence of wetland habitat, evidence of wetland habitat		
	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	

				Storm	Water Outfalls	s <b>OT</b>
WATERSHED/SUBS	HED: Goge	Bk	DATE:	15 10%	ASSESSED BY:	DRB
SURVEY REACH II	SURVEY REACH ID: 6-04 TIME: 6:50 AM/PM		РМ РНОТО ID	: (Camera-Pic #		1798
SITE ID (Condition-#		LAT <u>UI ° 5   5</u>		24 18.7"	LMK	GPS: (Unit ID)
BANK:           XLT         RT         Heat           FLOW:         Tricl	Closed	MATERIAL:		Double	DIMENSIONS: Diameter: <u>2,5 (ir</u>	SUBMERGED: No Partially Fully
Moderate Substantial Other:	Dpen channel	Concrete II I	Earthen Trapezo	c Widt	h: <u>(in)</u> h (Top): <u>(in)</u> Bottom): <u>(in)</u>	
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: D N Gas Sewage Rancid/So Sulfide Other:	⊠ None □Oily	NS: VEGGIE D M None Normal Inhibited Excessiv Other:	i F	PIPE BENTHIC GR Brown Ora Other: POOL QUALITY: Good Odors Suds Algae Other:	nge 🗌 Green 🕅 No pool 🗍 Colors 🔤 Oils
POTENTIAL RESTO	Needs Regular Mai	t/plastic bags) Intenance E ATE Discharge inv Storm water re	Dumping (bulk) Bank Erosion [ estigation ] Stream of trofit ] Other:		limentation Local stream repair	
<i>If yes for stormwate</i> Is stormwater currentl	r: y controlled?	ft Type	Use description:	1:	Slope:	°
<b>SEVERITY:</b> (circle #)	Heavy discharge with a strong smell. The amo	a distinct color and/or a unt of discharge is significant nt of normal flow in receiving ears to be having a istream.	available: Small discharge; flow m discharge has a color an discharge is very small c flow and any impact app	d/or odor, the amoun ompared to the strea ears to be minor / loc	t of m's base of couping	es not have dry weather staining; or appearance any erosion problems.
SKETCH/NOTES:		5 T-1 S	4 hsscreenj wtis elev unfoce by	3 loods lit outed of 1 ~1 fg	2) It on is ove wester (at stop of	1 rlet, 2 foul).
)				Rep	ORTED TO AUTHOR	ITIES: YES NO

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			Imp	acted Buf	fer IB
WATERSHED/SUBSHED: You	es Bk		DATE: 61510	58 Asse	SSED BY: D たろ
JIRVEY REACH: G-B-08	TIME:	5: 45 AM/PM	Рното ID: (Camer		
SITE ID: (Condition-#) START L	AT 41 ° 5/ ' 526"	LONG 77 ° 24			GPS: (Unit ID)
		Long °	' '' LMK		
IMPACTED BANK:     REASON IN       Image: Ima	ADEQUATE: Lack of	f vegetation 🔲 To y planted 🛛 Oth	o narrow 🗌 Widesprea	d invasive pl	ants
	Institutional Golf Cou	ırse Park O	ther Public	Ç.	
(Facing downstream) LT Bank					
RT Bank X DOMINANT Paved	Poro ground Turf/los			0.1	
LAND COVER: LT Bank	Bare ground Turf/la	U	Shrub/scrub Trees	Other	
RT Bank					
INVASIVE PLANTS: None		Partial coverage	Extensive coverage	·····	OWD
STREAM SHADE PROVIDED?		-			
		J Full WEIL	ands Present? 🗌 n	o 🗌 Ye	s 🔲 Unknown
POTENTIAL RESTORATION CANDIDA	ATE Active reforestat	ion Greenway o	design 🔲 Natural rege	neration 🔲 I	nvasives removal
RESTORABLE AREA           LT         BANK         RT           Length (ft):         300         300           Width (ft):         50-75         50-75	<b>REFORESTATION</b> <b>POTENTIAL:</b> ( <i>Circle #</i> )	Impacted area on pu where the riparian ar not appear to be use specific purpose; ple area available for pla	rea does public or private ed for any presently used for nty of purpose; availab	land that is or a specific le area for	Impacted area on private land where road; building encroachment or other feature significantly limits available area for planting
<u>GU-73</u>		5	4 3	<u> </u>	) 1
POTENTIAL CONFLICTS WITH REFOR	<b>RESTATION</b> W g impervious cover Se	idespread invasive vere animal impact	plants	ontamination her:	Lack of sun
NOTES:					
	L. C.				
	CAD				
HOLSE	sum to	Lown	structure in the second s	avse	
) Hover		NOU * -			

Stream	Cro	ssinc
Jucam	20	Source

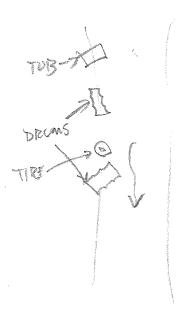
Stream Crossing	SC

WATERSHED	/subshed: Goods	,,,,,		DATE: 1	15168	ASSE	SSED BY:	
URVEY REA	A 11200	TIME: 7:25	AM/PM		D: (Camera-Pic			
PRODUCTION CONTRACTOR		U1051 : 53				MK	GPS (Unit ID)	
TYPE: Roa	d Crossing 🔲 Railroad Crossin	ng 🗾 Manmade I	Dam 🗌 Beav	er Dam 📘	Geological Form	nation 🗌	Other:	
			MATERIAL:	ALIGNMENT:		<b>DIMENSIONS:</b> ( <i>if variable, sketch</i> )		
	Arch Bottomless	Concrete	1	ow-aligned ot flow-aligned	Barrel dia	umeter: <u>1 % in (</u> ft) Height: <u>1 % in (</u> ft)		
FOR ROAD/	Circular Other:	Triple		4	$\Box$ Do not know			
RAILROAD CROSSINGS	CONDITION: (Evidence of)	Other:	iner:		CULVERT SLOPE:		Culvert length: <u>130</u> (ft)	
ONLY	Cracking/chipping/corrosion Downstream scour hole			🗌 🗌 F1	$\Box Flat$ $\Box Slight (2^{\circ} - 5^{\circ})$ $\Box Obvious (>5^{\circ})$		Width: <u>) &amp; (ft)</u> Roadway elevation: <u>12 (ft)</u>	
	Sediment deposition							
	Other (describe): 0000							
POTENTIAL H	RESTORATION CANDIDATE	Fish barrier re	emoval 🗌 Culv	vert repair/re	eplacement $\prod$ (	Jpstream s	torage retrofit	
🔲 no	•	Local stream		*	ioh ting	*	~	
IS SC ACTING	G AS GRADE CONTROL			11	C V			
	EXTENT OF PHYSICAL BLO	CKAGE:	[	BL	OCKAGE SEVER	RITY: (circ	:le #)	
	<ul> <li>✓ Total</li> <li>☐ Partial</li> <li>☐ Temporary</li> <li>☐ Unknow</li> </ul>	vn	A structure such		A total fish blocka	•	A temporary barrier such as a	
If yes for	• • • •	road culvert on greater stream			tributary that would isolate a significant reach of stream,		beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such	
fish barrier				upstream movement of anadromous fish; no fish		e that may migration of		
	Flow too shallow Water De	epth: (in)	passage device p	present.	anadromous fish.	U	as waterfalls.	
	Other: Dam		5		4 3	)	2 1	
NOTES/SKET	CH:							
		All						
		6	$\sim$					
	$1 \rho^{z}$	nð						
			an-ran land of the					
( Lawn								
-) 	and the second				Dupon			
L					KEPOR	TED TO AU	THORITIES YES NO	

Trash and Debris

r			şå				
WATERSHED/SUBSHED: Joges Brook				DATE: <u>6/5/08</u>		ASSESSED BY: 22	
JURVEY REACH ID: C3-03 TIME: 7: 10 AM/PM			PHOTO ID: (Camera-Pic #) DIS (ma /# 180161802				
SITE ID: (Condition=#) TR-OL LAT <u>41° 51 '54.4</u> " LONG <u>72° 24 ' 2.6</u> " LMK GPS: (Unit ID)							
TYPE: Industrial Commercial Residential	TiresAppliances	Paper Construction Yard Waste	Metal	SOURCE: Unknown Flooding J. Illegal dump Local outfall	LOCATION: Stream Riparian Are Lt bank Rt bank		
POTENTIAL RESTORATION CANDIDATE Stream cleanup Stream adoption segment Removal/prevention of dumping							
If yes for trash or debris removal							
CLEAN-UP POTENTIAL: (Circle #)	WHO CAN DO IT:       Volunteers       Local Gov       Hazmat Team       Other       Yes       No       Unknow         A small amount of trash (i.e., less than two pickup truck loads) located inside a park with easy access       A large amount of trash nay have been dumped over a long period of time but it could be cleaned up in a few days, possibly with a small backhoe.       A large amount of trash or debris scattered over a la or period of time but it could be cleaned up in a few days, possibly with a small backhoe.       A large amount of trash or debris scattered over a la or period of time but it could be cleaned up in a few days, possibly with a small backhoe.       A large amount of trash or debris scattered over a la area, where access is very difficult. Or presence of dru or indications of hazardous materials						
(Chere h)	(5)		4 3			2 1	
NOTES:	irze, Ba	TH TUB,	2 - 5	5 galle	r dru	m 5	
<u>)</u>					Reportei	D TO AUTHORITIES 🗌 YES 🗌 NO	

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RCH **Reach Level Assessment** ASSESSED BY: SURVEY REACH ID: WTRSHD/SUBSHD: DATE: 6 / 4 HES BK : 30 AM/PM TIME: 10 : 10 AM/PM START TIME: 🖗 END LMK: LMK: GPS ID: Long 70 • 20 • 5/ 7" ~1 + 40 SH LAT 1000 511 12 45 LONG 72 1 1 2 2 2 2 2 2 LAT ο **DESCRIPTION: DESCRIPTION:** RAIN IN LAST 24 HOURS 🗆 Heavy rain □ Steady rain PRESENT CONDITIONS □ Heavy rain Steady rain 🗆 Intermittent □ None Intermittent □ Trace ' □ Clear □ Trace □ Overcast □ Partly cloudy SURROUNDING LAND USE: Industrial □ Urban/Residential □ Suburban/Res Commercial □ Forested □ Institutional □ Golf course □ Park Crop □ Pasture □ Other: **AVERAGE CONDITIONS** (check applicable) **REACH SKETCH AND SITE IMPACT TRACKING** Simple planar sketch of survey reach. Track locations and IDs for all site impacts □ 0-25% **BASE FLOW AS %** □ 50%-75%⁻ within the survey reach (OT, ER, IB,SC, UT, TR, MI) as well as any additional CHANNEL WIDTH □25-50 % □ 75-100% features deemed appropriate. Indicate direction of flow DOMINANT SUBSTRATE □ Silt/clay (fine or slick) Cobble (2.5 -- 10")  $\Box$  Sand (gritty)  $\Box$  Boulder (>10") ☐ Gravel (0.1-2.5")  $\Box$  Bed rock WATER CLARITY I Clear Turbid (suspended matter) □ Stained (clear, naturally colored) □ Opaque (milky) □ Other (chemicals, dyes) Attached: none some lots **AQUATIC PLANTS** IN STREAM Floating:  $\Box$  none  $\Box$  some  $\Box$  lots (Evidence of) WILDLIFE IN OR Fish Beaver 🗹 Deer AROUND STREAM □ Snails □ Other:  $\square$  Mostly shaded ( $\geq$ 75% coverage) STREAM SHADING □ Halfway (≥50%) (water surface)  $\Box$  Partially shaded ( $\geq 25\%$ )  $\Box$  Unshaded (< 25%) Downcutting Bed scour CHANNEL Widening Bank failure **DYNAMICS** Headcutting Bank scour Aggrading Slope failure Unknown Sed. deposition Channelized Height: LT bank (ft) CHANNEL 100 C DIMENSIONS RT bank (ft)(FACING Width: Bottom (ft) DOWNSTREAM) 2 m Top (ft)**REACH ACCESSIBILITY** Fair: Forested or Difficult. Must cross Good: Open area in developed area wetland, steep slope, or public ownership, sensitive areas to get to adjacent to stream. sufficient room to Access requires tree stream. Few areas to stockpile materials, removal or impact to stockpile available easy stream channel landscaped areas. and/or located a great access for heavy Stockpile areas distance from stream. equipment using small or distant from Specialized heavy existing roads or trails. stream. equipment required. 5 4 3 **NOTES:** (biggest problem you see in survey reach)

**REPORTED TO AUTHORITIES** YES NO

	Optimal	Suboptimal	Marginal	Poor		
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.		
	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
BANK     Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems.       downstream)     <5% of bank affected.		Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.		
	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodpiain. Stream deeply entrenched.		
	20 19 18 17 /16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
	Over	ALL BUFFER AND FLOODPLA	IN CONDITION			
and a second		T T				
	Optimal	Suboptimal	Marginal	Poor		
VEGETATED Buffer Width	Optimal Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Suboptimal Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Marginal Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Poor Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.		
Buffer	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.Left Bank109	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal. 5 4 3	Width of buffer zone <10 feet: littl or no riparian vegetation due to human activities. 2 1 0		
Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.Left Bank109Right Bank109	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.543543	Width of buffer zone <10 feet: littl or no riparian vegetation due to human activities.		
Buffer Width Floodplain	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.         Left Bank       10       9         Right Bank       10       9         Predominant floodplain vegetation type is mature forest	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally. <u>8</u> 76 <u>8</u> 76 Predominant floodplain vegetation type is young forest	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal. 5 4 3	Width of buffer zone <10 feet: littl		
Buffer Width Floodplain	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.Left Bank109Right BankRight Bank109	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally. <u>8</u> 76 <u>8</u> 76 Predominant floodplain vegetation	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.543543974974974977991000 plain vegetation type is shrub or old	Width of buffer zone <10 feet: littl		
BUFFER WIDTH Floodplain Vegetation Floodplain	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.         Left Bank       10       9         Right Bank       10       9         Predominant floodplain vegetation type is mature forest	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally. <u>8</u> 76 <u>8</u> 76 Predominant floodplain vegetation type is young forest	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.543543Predominant floodplain vegetation type is shrub or old field1	Width of buffer zone <10 feet: littl		
BUFFER WIDTH Floodplain Vegetation Floodplain	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.         Left Bank       10       9         Right Bank       10       9         Predominant floodplain vegetation type is mature forest       20       19       18       17       16         Even mix of wetland and non-wetland habitats, evidence of standing/ponded       19       19       18       17       16	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally. <u>8</u> 7 6 <u>7</u> 6 Predominant floodplain vegetation type is young forest <u>15 14 13 12 11</u> Even mix of wetland and non-wetland habitats, no evidence of	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal. <u>5 4 3</u> <u>5 4 3</u> Predominant floodplain vegetation type is shrub or old field <u>10 9 8 7 6</u> Either all wetland or all non- wetland habitat, evidence of	Width of buffer zone <10 feet: littl		
BUFFER	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.         Left Bank       10       9         Right Bank       10       9         Predominant floodplain vegetation type is mature forest       20       19       18       17       16         Even mix of wetland and non-wetland habitats, evidence of standing/ponded water       10       9       10       10       10	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally. <u>8</u> 7 6 <u>8</u> 7 6 Predominant floodplain vegetation type is young forest <u>15 14 13 12 11</u> Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.         5       4       3         5       4       3         Predominant floodplain vegetation type is shrub or old field       10       9       7       6         Either all wetland or all non- wetland habitat, evidence of standing/ponded water       6	Width of buffer zone <10 feet: littl		

				Storm	Water Outfal	
WATERSHED/SUBS	SHED: CAGE	SEK	DATE:	514106	ASSESSED BY	: YEE
SURVEY REACH II	): 6B-19	ТIME: <u>10</u> : <u>2</u> дАМ/	РМ <b>Рното II</b>	<b>D:</b> (Camera-Pic #	TR (anou !#	1751
SITE ID (Condition-#	): OT	LAT 410 51 14	<u>+1.6" LONG 72° -</u>		LMK	GPS: (Unit ID)
BANK: LT RT Heat FLOW: None Tric Moderate	Closed	MATERIAL: Concrete PVC/Plastic Other:	Other:	r 🗍 Double al 🗍 Triple		SUBMERGED: No Partially Fully
Substantial	Open channel	- <u>ASPA</u>		ic Widt	h: <u>4 (in)</u> th (Top): <u>56 (in)</u> Bottom): <u>4 (in)</u>	NOT APPENCABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: 🕅 Gas Sewage Rancid/S	None Oily	INS: VEGGIE I		Brown Ora Other:	ROWTH: 🖾 None inge 🔲 Green
Corrosion	Sulfide	Definit Other:	Innbite     Excessi     Other:	- I P	OOL QUALITY: Good Odors Suds Algae Other:	Colors Oils
FLOWING ONLY     Tur FLO       OTHER     I	RBIDITY: 📲	None Slight Cloud None Sewage (toil per/plastic bags)		Opaque     Opaque     Petroleum (oil     Excessive Sec	dimentation	Other: Other: Ot to Stream
<u>`</u> no		DATE Discharge in		daylighting 🕅	Local stream repai	r/outfall stabilization
If yes for daylightir Length of vegetative	0	ll:ft Tyj	pe of existing vegetatio	on:	Slope	:°
If yes for stormwate Is stormwater current Yes No	ly controlled?	Nul ^e 3	nd Use description:	Fudustrial (	self west	musher?)
OUTFALL SEVERITY: (circle #)	strong smell. The am compared to the amo	·····		nd/or odor, the amoun compared to the strea pears to be minor / loc	nt of discharge um's base alized.	bes not have dry weather e; staining; or appearance g any erosion problems.
SKETCH/NOTES:		5	4	3	2	1
SALFICIPITOTES.		Prost				

REPORTED TO AUTHORITIES: YES NO

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WATERSHED/SUBS	HED: GAGES	BK.	DATE: $\underline{\mathcal{L}}$ / $\underline{\mathcal{L}}$	ASSESSED BY	: J25 E
SURVEY REACH ID		IME: T: 55 AM/PM			1749
SITE ID (Condition-#	): OT- <u>01</u>	AT <u>41 ° 51 '42.</u>	5" LONG 72 ° 25 '01.3	" LMK	GPS: (Unit ID)
BANK: LT RT Hea FLOW: None Trick	Closed	MATERIAL:	SHAPE: Single Metal Circular Double Brick Elliptical Triple		SUBMERGED:
Moderate Substantial	Dpen channel	Concrete Ea	arthen Trapezoid I Parabolic	Depth: <u>(in</u> Vidth (Top): <u>(in</u> " (Bottom): <u>(in</u>	NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: NO Gas Sewage Rancid/Sour		S: <b>VEGGIE DENSITY:</b> View None Normal Inhibited	PIPE BENTHIC G Brown Or Other: POOL QUALITY:	
Corrosion Other:	Sulfide	□ Paint ⊠Other: RSST	C Excessive	Good Odors Suds Algae	Colors 🕅 Oils
ONLY FLO	BIDITY: Noi ATABLES: Noi Excess Trash (paper/p	ne 🗌 Sewage (toilet ]	paper, etc.) X Petroleum		Other:
ONLY     FLO       OTHER     FLO       CONCERNS:     F       POTENTIAL RESTO       no	ATABLES: Non Excess Trash (paper/p Needs Regular Mainte RATION CANDIDAT	ie Sewage (toilet ] lastic bags) Du nance Ba	paper, etc.)	Sedimentation	Other:
ONLY     FLO       OTHER     FLO       CONCERNS:     F       POTENTIAL RESTO     no       If yes for daylightin,	ATABLES: Non Excess Trash (paper/p Needs Regular Mainte RATION CANDIDAT g:	1e       Sewage (toilet ]         lastic bags)       Dunance         nance       Ba         'E       Output         Storm water retreated	paper, etc.) Q Petroleum umping (bulk) C Excessive unk Erosion Other: stigation Stream daylighting	Sedimentation	Other:
ONLY     FLO       OTHER     FLO       CONCERNS:     F       POTENTIAL RESTO       no       If yes for daylighting       Length of vegetative of       If yes for stormwate	ATABLES: Non Excess Trash (paper/p Needs Regular Mainte RATION CANDIDAT g: cover from outfall: pr: y controlled?	1e       Sewage (toilet ]         lastic bags)       Dunance         nance       Ba         E       Image (toilet )         E       Image (toilet )         E       Image (toilet )         E       Image (toilet )         Image (toilet )       Image (toilet )         Image (toil	paper, etc.)  Petroleum umping (bulk)  Excessive unk Erosion  Other:  stigation  Stream daylighting ofit  Other:	Sedimentation	Other:
ONLY     FLO       OTHER     □       CONCERNS:     □       POTENTIAL RESTO       □ no       If yes for daylighting       Length of vegetative of       If yes for stormwate       Is stormwater currentl       □ Yes ☑ No       ○ UTFALL       SEVERITY:       (circle #)	ATABLES: Non Excess Trash (paper/p Needs Regular Mainte RATION CANDIDAT g: cover from outfall: pr: y controlled?	1e Sewage (toilet ] lastic bags) □ Du nance □ Ba E M Discharge inves Storm water retrong ft Type of Land U Area a stinct color and/or a of discharge is significant f normal flow in receiving s to be having a	paper, etc.)       Petroleum         umping (bulk)       Excessive         unk Erosion       Other:         stigation       Stream daylighting         ofit       Other:         of existing vegetation:	Sedimentation  Local stream repa  Slope  Slope  Outfall dd  discharg  stream's base	Other:
ONLY     FLO       OTHER     FLO       CONCERNS:     FLO       POTENTIAL RESTO     NO       In no     If yes for daylighting       Length of vegetative of     If yes for stormwate       If yes for stormwate     Is stormwater current       Yes     No       OUTFALL     SEVERITY:       (circle #)     In	ATABLES: Non Excess Trash (paper/p Needs Regular Mainte RATION CANDIDAT g: cover from outfall: _	1e Sewage (toilet ] lastic bags) □ Du nance □ Ba E M Discharge inves Storm water retrong ft Type of Land U Area a stinct color and/or a of discharge is significant f normal flow in receiving s to be having a	paper, etc.)       Petroleum         umping (bulk)       Excessive         unk Erosion       Other:         stigation       Stream daylighting         ofit       Other:         of existing vegetation:	Sedimentation  Local stream repa  Slope  Slope  Outfall dd  discharg  stream's base	Other: ir/outfall stabilization e:° ° 
ONLY     FLO       OTHER     □       CONCERNS:     □       POTENTIAL RESTO       □ no       If yes for daylighting       Length of vegetative of       If yes for stormwate       Is stormwater currentl       □ Yes ☑ No       ○ UTFALL       SEVERITY:       (circle #)	ATABLES: Non Excess Trash (paper/p Needs Regular Mainte RATION CANDIDAT g: cover from outfall: _	ie Sewage (toilet j lastic bags) □ Du nance □ Ba E M Discharge inves Storm water retro ft Type of Land U Area a stinct color and/or a of discharge is significant f normal flow in receiving s to be having a eam.	paper, etc.)       Petroleum         umping (bulk)       Excessive         unk Erosion       Other:         stigation       Stream daylighting         ofit       Other:         of existing vegetation:	Sedimentation     Local stream repa     Slope     Slope     Slope     Stream's base     / localized.     2	Other:         ir/outfall stabilization         e:

Stream	Cros	sinc

Stream Crossing SC	··· • •
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WATERSHED	SUBSHED: GAGE	5		DATE	E: /	14108	ASSE	SSED BY:	DRR
URVEY REA	сн ID: GR- 0억	TIME: <u>10</u> :00	_AM/PM			: (Camera-Pic			1750
SITE ID: (Con	dition-#) SC- OL LAT	410 51 147					мк	1	(Unit ID)
TYPE: 🗌 Roa	d Crossing 🔲 Railroad Crossii	ng 🕅 Manmade	Dam 🗌 Beave	-r Dam	, <u> </u>	Geological For	nation	Other:	
FOR ROAD/ RAILROAD	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS: Single Double Triple Other:	MATERIAL: Concrete Metal Other:	/ [ [	ALIGI ] Flo ] No	NMENT: w-aligned t flow-aligned not know	DIMENS Barrel dia	IONS: ( <i>if v</i> ameter: Height:	ariable, sketch) (ft) (ft)
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	Downstrear			] Fla ] Slig	ERT SLOPE: t ght (2° ~ 5 ⁰ ) vious (>5°)	Culvert le Roadway	Width: elevation:	(ft) (ft) (ft)
POTENTIAL F	RESTORATION CANDIDATE	Fish barrier re			air/rep	blacement 🔲 (	Jpstream s	torage retro	ofit
IS SC ACTING	G AS GRADE CONTROL		es 🗌 Unki						
If yes for fish barrier	Flow too shallow Water De	vn op: <u>32</u> (in)	A structure such a road culvert on a greater stream ble upstream moveme anadromous fish; passage device p	as a dam 3rd order ocking th ent of no fish	n or Fror	CKAGE SEVER A total fish blocka tributary that wou significant reach o or partial blockag interfere with the anadromous fish.	ge on a ld isolate a of stream, e that may migration of	A temporar beaver dan the very he very little vi	y barrier such as a n or a blockage at ad of a stream with able fish habitat atural barriers such ls.
) NOTES/SKET	Other:	and 2011 - Advanced	5		4	3		2	1
WEN AL-WS VALAMP (TREES Stravis)	ROAD Madarat Kanton ISTRAILS	Road (1)4 AM	A IF L	;	÷				
) 4-			A			Repor	TED TO AU	THORITIES	Yes No

Reach Level Assessment RCH

						L	
SURVEY REACH	D: <u>GB-10</u> w	TRSHD/SUBSHD:		Date: <u>6 / </u> 4	108 Ass	ESSED BY:	
START TIM	1e: <u>10:30/</u> AM/PM	M LMK:	END TIME:	: <u>45</u> AM/PM	LMK:		GPS ID:
LAT 0 51 '	42.3 " LONG	72024 156.9"	LAT 1 0 51 12	126" LONG	10 11 6d 1 5	(C))"	-
DESCRIPTION:			DESCRIPTION:				
RAIN IN LAST 24 H	OURS 🗆 Heavy rain	□ Steady rain	PRESENT CONDITIONS	□ Heavy rain	Steady rai	n 🗌 Interr	vittent
□ None	Intermitten	•			□ Overcast	□ Partly	
SURROUNDING LAN	ND USE:  Industria			🖾 Suburban/Res 🛛	Forested	□ Institu	
Averagi	E CONDITIONS (cha	zck applicable)	REACH	SKETCH AND SITE	е Імраст Т	RACKING	
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	⊠ 50%-75% □ 75-100%	Simple planar sketch o within the survey red	of survey reach. Track ach (OT, ER, IB,SC, U deemed appropriate. 1	T, TR, MI) as	well as any a	ite impacts dditional
<b>DOMINANT SUBSTR</b> Silt/clay (fine or Sand (gritty) Gravel (0.1-2.:	slick) $\square$ B	tobble (2.5 –10") soulder (>10") ed rock	jeauares (			st	, *** ***
	☑ Clear □Turbi naturally colored) □ dyes)			X	head		
AQUATIC PLANTS IN STREAM		ne 🖾 some 🗆 lots		No WY 1	V Clear		1. /
IN STREAM		$e \square some \square lots$					
WILDLIFE IN OR AROUND STREAM	(Evidence of) ☑ Fish □ Beav □ Snails ☑ Othe		~				
STREAM SHADING (water surface)	⊠ Mostly shaded □ Halfway (≥50% □ Partially shaded □ Unshaded (< 23	%) d (≥25% )	51				
CHANNEL Dynamics	Downcutting Widening Headcutting	Bed scour Bank failure Bank scour	(			۵ -	
Unknown	Aggrading 🔀 Sed. depositio	n Slope failure					
CHANNEL	Height: LT bank	(ft)					
DIMENSIONS	RT bank	(ft)			No. of Concession, Name		
(FACING DOWNSTREAM)	Width: Bottom	<u> </u>			3		
2011121121114	Тор	(ft)					
ŀ	REACH ACCESSIBILI	ТУ					
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using	Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas	Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/or located a great distance from stream.	resaidebris			1 	
existing roads or trails.	small or distant from stream.	Specialized heavy		1	k ∮ .	12	
5	لگ <del>و</del>	equipment required.					
NOTES: (biggest prob	olem you see in survey	reach)					

a sort

**REPORTED TO AUTHORITIES** YES NO

	Optimal	Suboptimal	Marginal	Poor	
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambanl surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetatio has been removed to 5 centimeters or less in average stubble height.	
	Left Bank (10) 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
BANK         Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems.           downstream)         <5% of bank affected.		Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding at a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.	
	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0	
	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0	
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	15 14 13 12 11 ALL BUFFER AND FLOODPLA	10 9 8 7 6	5 4 3 2 1 0	
	Optimal				
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Suboptimal Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Marginal Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Poor Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.	
	Left Bank (10) 9	8 7 6	5 4 3	2 1 0	
	Right Bank (10) 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land	
	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water	
	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function	
	20 (19) 18 17 16	15 14 13 12 11		5 4 3 2 1 0	

Storm	Water	Outfalls

OT
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WATERSHED/SUBS	SHED: GATES	STS TERON	DATE: 6 / 4 10	Assessed by: DP3		
SURVEY REACH I	D: 650	TIME::AM/PM	Рното ID: (Camera-l	Pic#) TRIANCE 1# 1765		
SITE ID (Condition-#	): OT- <u>Ø</u>	LAT 41 . 51 . 32.	1" LONG 72° 211 36			
		The const				
BANK:           LT IT IT           He           FLOW:           None	Closed	MATERIAL: Concrete PVC/Plastic Other:	SHAPE:       Single         Metal       Circular       Doubl         Brick       Elliptical       Triple         Other:       Other:	DIMENSIONS:     SUBMERGED:       e     □ No       Diameter:     (in)       □ Partially       □ Fully		
Moderate Substantial Other:	Channel	Concrete Ea Other: Ciper Vegetal		Depth: $G \xrightarrow{-1 2} (in)$ Width (Top): $U^{1} \xrightarrow{5} (in)$ NOT APDESCABLE " (Bottom): $U^{2} \xrightarrow{1} (in)$		
CONDITION:	ODOR: ∅ N □Gas □ Sewage □Rancid/So □ Sulfide □ Other:	^a None Oily		PIPE BENTHIC GROWTH: None         Brown       Orange         Green         Other:         POOL QUALITY:       No pool         Good       Odors       Colors         Suds       Algae       Floatables         Other:       Other:       Other		
FOR       COLOR:       Clear       Brown       Grey       Yellow       Green       Orange       Red       Other:         FLOWING       TURBIDITY:       None       Slight Cloudiness       Cloudy       Opaque         ONLY       FLOATABLES:       None       Sewage (toilet paper, etc.)       Petroleum (oil sheen)       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation         CONCERNS:       Needs Regular Maintenance       Bank Erosion       Other:       Other:       Other:         POTENTIAL RESTORATION CANDIDATE       Discharge investigation       Stream daylighting       Local stream repair/outfall stabilization						
no no		Storm water retro	ofit $\square$ Other: $\land \square \square \lor$	1702		
If yes for daylightin	•					
Length of vegetative	cover from outfall:	ft Type of	of existing vegetation:	Slope:°		
If yes for stormwate Is stormwater current	ly controlled?	Land U Area a	Jse description: Resident	al-men subdivision		
OUTFALL SEVERITY: (circle #)	compared to the amour stream; discharge appe significant impact down	unt of discharge is significant nt of normal flow in receiving ears to be having a nstream.	Small discharge; flow mostly clear and discharge has a color and/or odor, the a discharge is very small compared to the flow and any impact appears to be mino	mount of stream's base r / localized.		
		5 4	3	2 1		
SKETCH/NOTES:	E wa	TE C (BOWSED	A			
	×11	real R	Sector Sector			
1A		RITHLE C	NUT A	REPORTED TO AUTHORITIES: YES NO		

				Impacte	d Buffer
WATERSHED/SUBSHED:	The second se	-	DATE: 6	14 108	ASSESSED BY:
JRVEY REACH: GB -10	TIME:	: 5 AM/PM			#) Ginon 1# 176-3
	T <u>41°5132.0"</u> ]			LMK	GPS: (Unit ID)
	T <u>41°51'31.7</u> " 1				
			100		
IMPACTED BANK:     REASON INA       LT     RT     Both	DEQUATE: Lack of	vegetation Too y planted VOth	o narrow	Widespread inva	asive plants
LAND USE: Private Ir	nstitutional Golf Cou	urse Park Ot	her Public		
(Facing downstream) LT Bank					
RT Bank					
<b>DOMINANT</b> Paved LAND COVER: LT Bank	Bare ground Turf/lav		Shrub/scrut		Other
RT Bank			d D		
INVASIVE PLANTS: None		Partial coverage		<u></u>	i ] unknown
STREAM SHADE PROVIDED?	e 🔤 Partial	Full WETL	ANDS PRESI	ent? 🗌 No	Yes Unknown
POTENTIAL RESTORATION CANDIDAT	TE Active reforestat	ion 🔲 Greenway d	lesign 🗗 N	latural regeneratio	on 🔲 Invasives removal
RESTORABLE AREA		Impacted area on put	plic land	pacted area on either	Imported area or private
$\begin{array}{c} LT & BANK & RT \\ Length (ft): \underline{250} & \underline{200} \\ Width (ft): \underline{50}^{-4} & \underline{50}^{-4} \end{array}$	<b>REFORESTATION</b> <b>POTENTIAL:</b> ( <i>Circle</i> #)	where the riparian are not appear to be used specific purpose; pler area available for plan	ea does pu d for any pre nty of pu	pacted area of entite blic or private land the esently used for a spe rpose; available area anting adequate	at is land where road; building ecific encroachment or other
		5	4	3)	2 1
POTENTIAL CONFLICTS WITH REFORE		idespread invasive p vere animal impact	plants 🔲 s (deer, beav	Potential contamiver)  Other:	ination 🔲 Lack of sun
NOTES: Buffer from G.	B coordinate	to SC			
1					
	·				,

	Stream	Crossin	1
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Stream Crossing	SC	
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WATERSHED/SUBSHED:       DATE:       D/1/2/2%       ASSESSED BY:         JURVEY REACH ID:       (-1/2/4)       TIME:       ::::::::::::::::::::::::::::::::::::
SITE ID: (Condition-#)       SC       LAT       Image: Site intermediate intermediat
TYPE: PRoad Crossing Railroad Crossing Manmade Dam Beaver Dam Geological Formation Other:         FOR ROAD/         SHAPE:       # BARRELS:         Arch       Bottomless         Box       Elliptical         Double       Matterial:         Clock       Elliptical         Other:       Do not know         Crossing       Concrete         Other:       Do not know         Crossing       Control         Other:       Other:         Other:       Do not know         Cassing/chipping/corrosion       Downstream scour hole         Stadiment deposition       Failing embankment         Other:       Obvious (>5°)         Roadway elevation:       Geological Formation         Width:       Quivert length:         Width:       Quivert         POTENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         In no       Doal stream mepair       Other:       A total fish blockage on a thoulary barrier such as a dam or nadromous fish; no fish passage device present.       A total fish blockage on a thoulary barrier such as adam or nadromous fish; no fish passage device present.         If yes for fish barrier       Drop too high       Water Drop:       (in)
FOR ROAD/ RAILROAD CROSSINGS ONLY       SHAPE: Arch Bottomless Box Elliptical       # BARRELS: Single Double Circular       MATERIAL: Single Double Triple       ALIGNMENT: Single Double       DIMENSIONS: (if variable, sket Barrel diameter: 20/2         CROSSINGS ONLY       Other:       Double       Metal Double       Not flow-aligned Do not know       Barrel diameter: 20/2         CROSSINGS ONLY       Other:       CONDITION: (Evidence of) Cracking/chipping/corrosion Downstream scour hole Sediment deposition Other (describe):       Downstream scour hole Failing embankment       Flat Sight (2° - 5°)       Culvert repair/replacement       Upstream storage retrofit         POTENTIAL RESTORATION CANDIDATE In no       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         If yes for fish barrier       Total Do to to high Flow too shallow Water Drop:       No       Yes       Unknown         If yes for fish barrier       CAUSE: Do to to high Flow too shallow Water Depth:       (in) Doher:       A structure such as a dam or nadcomous fish, no fish passage device present.       A total fish blockage on a tributary that would isolate a on partial blockage that may interfere with the migration of anadornous fish, no fish passage device present.       A temporary barrier such anadornous fish, no fish passage device present.       A temporary barrier such anadornous fish, no fish passage device present.
FOR ROAD/ RAILROAD CROSSINGS       Arch       Bottomless       Single       Concrete       Flow-aligned       Barrel diameter:       QUAR         CROSSINGS       Conder:       Other:       Other:       Other:       Other:       Culvert slope:         Construction       Conder:       Other:       Other:       Culvert slope:       Culvert length:       Quart         Construction       Conder:       Downstream scour hole       Flat       Slight (2° - 5°)       Culvert length:       Width:       Quart         Conder:       Other:       Downstream scour hole       Flat       Slight (2° - 5°)       Roadway elevation:       Conderse         Potential Restoration Candidate       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         In no       Local stream repair       Other:       Other:       A total fish bockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of nadorwous fish, no fish anadromous fish, no fish anadromous fish.       A total fish bockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of a anadromous fish.       A temporary barrier such as a dam or partial blockage that may interfere with the migration of a stockage that may interfere with the migration of a stockage that may interfere with the migration of a stockage that may interfere with the migration of stream, an
POTENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         Image: Second stream repair       Other:       Other:       Image: Second stream repair       Other:         Is SC ACTING AS GRADE CONTROL       No       Yes       Unknown         If yes for fish barrier       Total       Partial       A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish, no fish passage device present.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A total fish blockage that may interfere with the migration of anadromous fish.       A total fish blockage that may interfere with the migration of anadromous fish.       A total fish blockage that may interfere with the migration of anadromous fish.       A total fish blockage that may interfere with the migration of anadromous fish.       A total fish blockage that may interfere with the migration of anadromous fish.       A total fish blockage that may interfere with the migration of anadromous fish.       A total fish blockage that may interfere with the migration of anadromous fish.       A total fish hab         If yes for       Image: Second the partial blockage that may interfere with the migration of anadromous fish.       A total fish hab       A total fish hab         If yes for       Image: Second the partial blockage that may interfere with the migration of anadromous fish.       A total fish hab
Is SC ACTING AS GRADE CONTROL IN O Yes Unknown EXTENT OF PHYSICAL BLOCKAGE: Total Partial Temporary Unknown If yes for fish barrier CAUSE: fish barrier Flow too shallow Water Drop: (in) Other: 5 4 3 2 1 NOTES/SKETCH:
EXTENT OF PHYSICAL BLOCKAGE:       BLOCKAGE SEVERITY: (circle #)         Total       Partial         Temporary       Unknown         If yes for       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of a stream or passage device present.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of a stream or passage device present.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of as waterfalls.       A temporary barrier such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of a stream or passage device present.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of as waterfalls.         Other:       5       4       3       2       1         NOTES/SKETCH:       State of the stream of th
If yes for       Image: Cause:       Partial       A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A temporary barrier such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A temporary barrier such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.         Other:       5       4       3       2       1
NOTES/SKETCH:
Notes/Sketch: Williegh is shirabler and plassic
First reck biddurs
Reported to authorities 🗌 Yes [

## Utility Impacts

Utility Impacts							UT
WATERSHED/SUBSH	ED: GAGES FK	DATE: 🙆	M IDS	Assessed	BY: DEB		
SURVEY REACH ID:	GB-10	Тіме: <u>   :  </u>	AM/PM	Рното ID: (Ca	amera-Pic #)	Canon -	1# 176 2
SITE ID: (Condition-#)	UT- <u>O</u> L LAT	41051 32	<u>'</u> " Long <u>7</u> 2	· 24 · 42.7			(Unit ID)
TYPE: Leaking sewer Exposed pipe Exposed manhole Other: NEW CROSSING NEW CROSSING MILIARY CROSSING MILIARY MILIARY CROSSING MILIARY CROSSING MILIARY CROSSING MILIARY MILIARY CROSSING MILIARY MILI	MATERIAL: Concrete Corrugated metal Smooth metal PVC Other: UNIL NBAL	LOCATION: Floodplain Stream bank Above stream Stream botto Other: Root	n CONDI		failure	PE DIMENSIO	in ft n/cracking er absent
EVIDENCE OF DISCHARGE:	COLOR None ODOR None DEPOSITS None ATION CANDIDATE	e Sewage Tampons/To	irk Brown 🛄 I Oily 🛄 Sulfio ilet Paper 🛄 I irs 🗌 Pipe test	t Brown 🗋 Yello de 🗌 Chlorine ime 🗌 Surface oi ing 🗌 Citizen ho	wish 🔲 Greenis Other: Is 🛄 Stains 🛄	sh 🗌 Other: Other:	
If yes to fish barrier, w	ater Drop: (in	)				• · · · · · · · · · · · · · · · · · · ·	
SEVERITY: (Circle #)	Section of pipe undermined by collapse in the near future; a p he bed or suspended above the section along the edge of the s he entire side of the pipe is ex nanhole stack that is located in stream channel and there is ev ailure.	ipe running across ne stream; a long tream where nearly posed; or a n the center of the	partially exposed immediate threat to undermined and b immediate future. is that the pipe ma	hat the pipe will be	Small section of ex pipe is stable; the p stream but only a s exposed; the pipe concrete and it is n fish movement; a n the stream and doo active stream chan	pipe is across the small portion of the sexposed but is not causing a block nanhole stack the sen not extend ver	e bottom of the ne top of the pipe reinforced with ckage to upstream at is at the edge of
	5		4	3	2		
NOTES:		lo espo	la piji		ORTED TO LOCAI	L AUTHORITIE	es 🗌 Yes 🗍 No

LADORTS Raj WODF 245v K 1010 STOP-

Stream	Cros	sind

Stream Crossing	SC	
-----------------	----	--

r			·····				
3	/SUBSHED: Laver tankerhi		- CAL	DATE: <u>6</u>			SSED BY: 6A JS, B7
And alter constrained, earlier	.ch ID: LTR-03	<u>Тіме: 4 : 5</u>	and the second se		<b>):</b> (Camera-Pie	c#) 29,	
SITE ID: (Con	dition-#) SC0/LAT	<u>41 ° 49 '27.</u>	<u>2</u> " LONG <u>72</u>	<u>° 29 '</u>	<u>15%</u> " L	мк	GPS (Unit ID)
				~ □	<u> </u>		0.1
	ad Crossing 🔲 Railroad Crossin	ng XManmade	MATERIAL:		Geological For		
	SHAPE: Arch Bottomless	# DARRELS:	Concrete		NMENT: ow-aligned	Barrel dia	IONS: ( <i>if variable, sketch</i> ) meter: (ft
	Box Elliptical	Double	Metal		ot flow-aligned		Height:(ft)
FOR ROAD/ RAILROAD	Circular Other:	☐ Triple ☐ Other:	Other:	D Do	Do not know		
CROSSINGS	CONDITION: (Evidence of)		J	CULA	CULVERT SLOPE:		ength:(ft)
ONLY	Cracking/chipping/corrosion	a 🗌 Downstream	n scour hole	🛛 🗌 Fla	at		Width:(ft
	Sediment deposition	Failing emb	ankment		ght $(2^{\circ} - 5^{\circ})$		
	Other ( <i>describe</i> ):				ovious (>5°)	Roadway	elevation:(f
POTENTIAL F	RESTORATION CANDIDATE	Fish barrier re	emoval 🗌 Culver	t renair/re	nlacement 🔲 I	Instream et	orage retrofit
no		Local stream		· ·		por oan or	orago renorm
	G AS GRADE CONTROL						N Nova (1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
	EXTENT OF PHYSICAL BLO				CKAGE SEVEI	RITY: (circ.	le #)
	🕅 Total 🗌 Partial		A structure such as				A temporary barrier such as a
If yes for fish barrier CAUSE:	Temporary Unknow	vn	road culvert on a 3rd greater stream block	d order or	tributary that wou	tributary that would isolate a beaver dam of	
		111 W. D. ()		king the tof			the very head of a stream wit very little viable fish habitat
	Drop too high Water Dr	op: (in)	anadromous fish; no passage device pres		interfere with the anadromous fish.		above it; natural barriers such as waterfalls.
	Other:	-pui (iii)					
NOTES/SKET	CH:		(5)		43		2 1
						•	
)					_		
	······				REPOR	TED TO AUT	THORITIES 🗌 YES 🗌 NO

SUBJECT TRACE ID: 222-25       WINSHUSUBSID: [auto: fank, Tiwit       DATE: 41.5.124       SSUB TS: 50         STAFT       TIME: 4	SURVEY REACH ID: 172-03 WTRSHD/SUBSHD: /	Reach Level Assessment <b>RCI</b> DATE: 615108 ASSESSED BY: 70
SVmme       Intermittent       Trace       Severest       Partly cloudy         SURROUNDING LAND USE:       Industrial       Commercial       Urban/Residential       Subbrhan/Res       Rescription         AVERAGE CONDITIONS (check applicable)       REACH SKETCH AND SITE IMPACT TRACKING         Base Flow AS %       0.25%       90%-75%         Image: State of subbrhan/Res       Reach Sketch of subbrhan/Res       Reach Sketch of subbrhan/Res       Reach Sketch of subbrhan/Res         Dominant's Users Tart:       Solution       State for subbrhan/Res       Reach Sketch of subb	<i>START</i> TIME: <u>4</u> : <u>04</u> AM/PA LMK: LAT <u>4(° 49 '20,5</u> " LONG <u>77 ° 79 '41,5</u> "	$\begin{array}{c c c c c c c c c c c c c c c c c c c $
□ Golf course       □ Park       □ Crop       □ Parkure       □ Other:       Pigh way         AVERAGE CONDITIONS (check applicable)       REACH SKETCH AND STEE INFACT TRACKING         Base Flow as %       □ 0-25%       □ 50%-75%       Simple planar sketch of survey reach. Track locations and Dis for all site impacts         Channel William       □ Cobble (2.5 - 10°)       □ Boulder (>10°)       □ Mathematics       Way is well as any additional factor direction of flow         Dominant Substrate       □ Cobble (2.5 - 10°)       □ Boulder (>10°)       □ Dimension of flow         Stand (gring)       □ Boulder (>10°)       □ Boulder (>10°)       □ Boulder (>10°)       □ Dimension of flow         Stande (chemical, dyez)       S or neuronal       □ Oppart (milliam)       □ Dimension of flow         Other (chemical, dyez)       S or neuronal       □ Oppart (milliam)       □ Dimension of flow         Wildlife IN or       Stande (cital)       © oppart (milliam)       □ Dimension of flow         Wildlife IN or       © oppart (milliam)       □ Dimension of flow       □ Dimension of flow         Wildlife IN or       © oppart (milliam)       □ Dimension of flow       □ Dimension of flow         Wildlife IN or neuronal       Ø oppart (milliam)       □ Dimension of flow       □ Dimension of flow         Wildlife IN or neuronal       Ø oppart (m		
BASE FLOW AS %       0-25%       05%-75%         CHANNEL WIDTH       22-50 %       075-7100%         DOMINANT SUBSTRATE       0       050%-75%         DOMINANT SUBSTRATE       0       050%-75%         DOMINANT SUBSTRATE       0       050%-75%         Silloclas (fine or slick)       0       00%-75%         Silloclas (fine or slick)       0       00%-75%         Gravel (0.1-2.5")       0       0         Bad (gritty)       0       0       0         Silloclas (fine or slick)       0       0       0         Other (chemicat), dive)       Some lots       0       0         Sinalis       0       0       0       0         Wildeling       Bank sour       0       0       0         Sinalis       0       0       0       0       0         Wildeling       Bank failure       0       0       0       0         Division       0       0       0       0       0		
CHANNEL WIDTH 225-50 % Production of the survey reach (07. ER, 18.50, CU, 7. R, M) as well as any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deemed appropriate. Indicate direction of flow for any additional features deema for any additin the street features deema	AVERAGE CONDITIONS (check applicable)	REACH SKETCH AND SITE IMPACT TRACKING
Situation on based of cases of real source of the stream free areas to stream subcent room based of cases of real stream stream free areas to stream stream free areas to stream stream free areas to stream stream contraction on based of cases of real stream stream contraction on based of cases of real stream stream contraction on based of cases of real stream stream contraction on based of cases of real stream stream contractions and cases of real stream contractions and cases of rea		within the survey reach (OT, ER, IB,SC, UT, TR, MI) as well as any additional
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	□ Silt/clay (fine or slick) □ Cobble (2.5 −10") □ Sand (gritty) □ Boulder (>10")	Racky S
IN STREAM       Floating: $\Box$ non $\Box$ some $\Box$ tot         WILDLIFE IN OR AROUND STREAM       Evidence of Tish $\Box$ Beaver $\Box$ beer         STREAM SHADING $\Box$ Mostly shaded ( $\geq$ 75% coverage) $\Box$ Haffway ( $\geq$ 50%) $\Box$ Haffway ( $\geq$ 50%) $\Box$ Haffway ( $\geq$ 50%) $\Box$ Unknown $\Box$ Bank failure $\Box$ Headoutting $\Box$ Headoutting $\Box$ Unknown $\Box$ Bed scour $\Box$ Stock deposition $\Box$ Bed scour $\Box$ Stock deposition $\Box$ Unknown       Aggrading Set deposition $\Box$ Stock (ft) Top $\Box$ (ft) $\Box$ (ft) $\Box$ Channelized $\Box$ (ft) $\Box$ ( $\Box$	Stained (clear, naturally colored)   Opaque (milky)	Marked TO Hare TO STREP ON CLIFF WALL WILL GPS AT TOPSIC
WILDLIFE IN OR       Image: Stream       Image: Strea		Dysig Steel
STREAM SHADING       Halfway ( $\geq$ 50%)         (water surface)       Partially shaded ( $\geq$ 25%)         Unshaded ( $<$ 25%)       6ft         CHANNEL       Downcutting         DYNAMICS       Headcutting         Headcutting       Bank failure         Headcutting       Bank scour         Stope failure       Channelized         CHANNEL       Height: LT bank $2.5$ (ft)         DIMENSIONS       RT bank $4.5$ (ft)         (FACING DOWNSTREAM)       Width: Bottom $20$ (ft)         Duble ownership, sufficient former       Access requires tree movel or impact to stream. Access requires tree movel or impact to stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance from stream. Stockpile available and/or located a great distance fr	APOUND STREAM Fish Beaver Deer	Remains and Land Conce
DYNAMICSWidening Headcutting AggradingBank failure Bank scour Slope failure ChannelizedControl Headcutting Bank scour Slope failure ChannelizedControl Height: LT bank $\frac{2.5}{(ft)}$ Control Height: LT bank $\frac{2.5}{(ft)}$ Control 	STREAM SHADING□ Halfway (≥50%)(water surface)□ Partially shaded (≥25%)	6ft 2,5th FNS17 OF DAM
DOWNSTREAM)       Width: Bottom       20       (ft)         Top       25       (ft)         REACH ACCESSIBILITY       Difficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.       Difficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.       4.0       Fair. Forested or developed area stockpile areas to stockpile areas small or distant from stream.       Difficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.       4.0       Fair. Forested or developed area stockpile areas         5       4       3       2       1       Tot Advise to Tapel	DYNAMICS     Widening     Bank failure       Headcutting     Bank scour       Aggrading     Slope failure	444 Print Colvert
$\frac{20}{100}$ (ft) $\frac{1}{25}$ (ft) 	CHANNEL Height: LT bank $\frac{2.5}{(1+5)}$ (ft)	K K Prata ( Perolan )
REACH ACCESSIBILITY         Good: Open area in public ownership, sufficient room to public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.       Difficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.       Difficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.       Bank         5       4       (3)       2       1         NOTERS: discust how the public of the public o	$OOWNSTREAM$ ) whith: Bottom <u>$\sim C$</u> (ff)	A de la
access for heavy equipment using existing roads or trails.       Iandscaped areas. Stockpile areas small or distant from stream.       and/or located a great distance from stream. Specialized heavy equipment required.         5       4       (3)       2       1		R. With (AB)
Stockpile areas equipment using existing roads or trails.     Stockpile areas small or distant from stream.     distance from stream. Specialized heavy equipment required.       5     4     (3)     2     1	Good Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for beavy         developed area adjacent to stream.         wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/cor located a great	4.0 PRIFORMENT BONYMENT Walford BANK
NOTES // image / image	equipment using small or distant from stream. Stockpile areas small or distance from stream. Specialized heavy equipment required.	
J.	NOTES: (biggest problem you see in survey reach) * STOIM WOTCR COTCL BOSIN FOR	

	Optimal	Suboptimal	Marginal	Poor	
IN-STREAM         Greater than 70% of substrate           HABITAT         favorable for epifaunal colonization and fish cover; mix of snags, submerged           (May modify criteria based on appropriate habitat regime)         logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).		40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lac of habitat is obvious; substrate unstable or lacking.	
	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	ks stable; evidence of erosion ank failure absent or minimal; potential for future problems. of bank affected.		Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0	
FLOODPLAIN Connection	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	
	20 19 18 17 16 Over	15 14 13 12 (11) ALL BUFFER AND FLOODPLAI	10 9 8 7 6	5 4 3 2 1 0	
	Optimal				
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Suboptimal Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Marginal Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Poor Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.	
	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0	
	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0	
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water	
	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function	
	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0	

			Stor	rm Water Outfalls	ΟΤ
WATERSHED/SUBSHE	D: LOWOR TO	ok, River	DATE: 61510	<b>K</b> Assessed by:	15 RT. 6A
SURVEY REACH ID:	LTR-03 TI	ME: <u>4: 24</u> AM/RM	Рното ID: (Camera-Pi	0.4	<del>-</del>
SITE ID (Condition-#): (	DT- <u>O(</u> LA	т <u>41 ° 44 '73%</u> "Lo	DNG 720 29 3/4		GPS: (Unit ID)
BANK: XLT RT Head FLOW: None X Trickle	TYPE:	MATERIAL: Concrete Metal PVC/Plastic Brick Other:	SHAPE:     Single       Circular     Double       Elliptical     Triple       Other:	<b>DIMENSIONS:</b> Diameter: <u>(in)</u>	SUBMERGED:
Moderate Substantial	Copen channel	Concrete Earthen	Parabolic W	epth: <u>(in)</u> /idth (Top): <u>(in)</u> ' (Bottom): <u>(in)</u>	NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: $\Box$ No $\Box$ Gas $\Box$ Sewage $\Box$ Rancid/Sour	DEPOSITS/STAINS:	VEGGIE DENSITY: None Normal Inhibited	Other:	ge 🗌 Green
Corrosion	Sulfide	□ Paint ☑Other: ₽15TY	Immonted     Excessive     Other:	POOL QUALITY: [ Good Odors [ Suds Algae [ Other:	Colors Oils
	DITY: None	<ul> <li>Slight Cloudiness</li> <li>Sewage (toilet paper, e stic bags)</li> </ul>	Cloudy     Opaque       tc.)     Petroleum       (bulk)     Excessive	Sedimentation	ther:
🗌 no	TION CANDIDATE	Discharge investigation	n 🗌 Stream daylighting   🛱 Other: (JK70Min		outfall stabilization
If yes for daylighting: Length of vegetative cov	er from outfall:	ft Type of exist	ing vegetation:	Slope:	o
If yes for stormwater: Is stormwater currently c Yes No Not		Land Use des Area available	-		
SEVERITY: con (circle #) str	avy discharge with a dist ong smell. The amount of npared to the amount of eam; discharge appears nificant impact downstrea 5	f discharge is significant normal flow in receiving to be having a	ischarge; flow mostly clear and or ge has a color and/or odor, the am ge is very small compared to the s d any impact appears to be minor a 3	ount of discharge; s	not have dry weather staining; or appearance any erosion problems.
SKETCH/NOTES:				and the second se	<u> </u>
	J-84 RU 70 7 Sludg	nolle gous 70 ziver, silty c Bottom.	Renentions Po / orange / Rus	1N) -7 Pon 17 -7 71+ick	
)				REPORTED TO AUTHORIN	

Reach Level Assessment

SURVEY REACH	D:MTL-O W	TRSHD/SUBSHD:	N.T.V. Rus	DATE: 6 / 4	ASSESSED BY	- mar 10
START TIM		M LMK:	END TIME:	3:40 AM/PM	<u>Jt_GA_JS</u>	GPS ID:
LAT MO HA !	36.0 " LONG	12 0 246 1244 "	LAT 41 º 49 '		2027 1 52.5"	
DESCRIPTION:	whit to pr		DESCRIPTION: St	ream Dalina	INTO TWO	
	OURS 🗆 Heavy rain		PRESENT CONDITIONS	-	· · ·	
□ None					,	tly cloudy
SURROUNDING LAN	DUSE: 🗆 Industria	al 🗆 Commercial 1rse 🗆 Park	□ Urban/Residential □ Crop	Suburban/Res		tutional
Averagi	E CONDITIONS (che	eck applicable)	-		TE IMPACT TRACKING	and the second
BASE FLOW AS %	□ 0-25%	□ 50%-75%	Simple planar sketch	of survey reach. Tra	uck locations and IDs for al.	site impacts
CHANNEL WIDTH	□25-50 %	₩75-100%	within the survey r	each (OT, ER, IB,SC,	UT, TR, MI) as well as any Indicate direction of flow	additional
DOMINANT SUBSTR	· · · /		journe		I malcule un ection of flow	
□ Silt/clay (fine or □ Sand (gritty)		obble (2.5 –10") oulder (>10")		and the second s	24 ⁰	
Gravel $(0.1-2.5)$		ed rock		port - R	Ex SID	- And and a second s
			-	es l	S. Constanting of the Constantin	12 3
	Clear □Turbi					
$\Box$ Other <i>(chemicals,</i>		- Ladae (umb)		hoł	An >	
AQUATIC PLANTS	Attached: 🗌 nor	ne 🗆 some 🗆 lots	-	18	(MDP)	
IN STREAM	Floating: 🗌 non	e □ some □ lots		4 1965	1/25t Horsen - Awards	t and a
WILDLIFE IN OR	(Evidence of)	1	X	. 3 ⁹ /		to
AROUND STREAM	☐ Fish ⊅ Beav □ Snails □ Othe		57	146.00	( LOUNUP	ZBED,
	Mostly shaded			N. J. W. C. 1	(mary)	101
STREAM SHADING	KHalfway (≥50%	6)	1 18 32	New St	01-21	and the second sec
(water surface)	□ Partially shaded □ Unshaded (< 2:		1 5 3 5	V Hill		
			-14 - 14-	S-VIII	i franciska se	
CHANNEL DVNA MICE	Downcutting	Bed scour	Provide Contraction		poss is	E NEW R
DYNAMICS	Headcutting	Bank scour			V	
Unknown	Aggrading	Slope failure		modes -	Marine , while is also	and the second
	Sed. depositio	n Channelized	-	Ze.	· ·	$\frac{1}{L}$
CHANNEL	Height: LT bank	(ft)	1	7.4x	and	i
DIMENSIONS	RT bank	<u> </u>	254	1, of K	VAN DH	
(Facing downstreaM)	Width: Bottom	<u> </u>	in e		OT-UL PAN	E
· · · ·	Тор	(ft)	30	and the second se	Pr. Supr	
ł	REACH ACCESSIBILI				1773°	
Good: Open area in	Fair: Forested or developed area	Difficult. Must cross wetland, steep slope, or	7		110-	
public ownership, sufficient room to	adjacent to stream.	sensitive areas to get to	j Mari	7 St	355 br	a subsection of the second sec
stockpile materials, easy stream channel	Access requires tree removal or impact to	stream. Few areas to stockpile available	I.OK	L m. 1- 910W	- K	_
access for heavy	landscaped areas. Stockpile areas	and/or located a great distance from stream.	1814-	- Slow murment - DEE?	+ te.	(Juni)
equipment using existing roads or trails.	small or distant from	Specialized heavy	muday	- Deci	ger D	JT-03
	stream.	equipment required.			A	LANN M
NOTES: (biggest prol		reach)	POWIN			the I
				Repor	TED TO AUTHORITIES	YES NO

	Optimal	Suboptimal	Marginal	Poor
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lach of habitat is obvious; substrate unstable or lacking.
	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	(2) 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN Connection	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
·····	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	Over	ALL BUFFER AND FLOODPLAI	N CONDITION	
	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 (4) 3	2 1 0
• <u></u>	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field / WETIY2ND / TV/F	Predominant floodplain vegetation type is turf or crop land
····	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function
	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0

				Sto	rm Water	⁻ Outfalls	ΟΤ	
WATERSHED/SUBSI	IED:			DATE: 6 / 4 / 0% ASSESSED BY:				
SURVEY REACH ID	MA- 51 1	ГІМЕ: <u>2:30</u> ам/рм	$\hat{\mathbf{v}}$	Рното ID: (Camera-Pi	c #)	/# 24	· · · · · · · · · · · · · · · · · · ·	
SITE ID (Condition-#):	OT1	LAT 4 . 49 . 36.1	L" Loi	NG 12 ° 24 163 1	' LMK	G	<b>PS:</b> (Unit ID)	
BANK: LT RT Head FLOW: None Trick	Closed	MATERIAL: Concrete M PVC/Plastic H Other:	Metal Brick	SHAPE: Single Circular Double Elliptical Triple Other:	DIMENS	ft.	SUBMERGED:	
Moderate Substantial Other:	Dpen channel	Concrete Ea	rthen	Parabolic W	epth: /idth (Top):_ ' (Bottom):_		NOT APPEICABLE	
CONDITION: None Chip/Cracked Peeling Paint	ODOR: NC Gas Sewage Rancid/Sour	☐ None ☐ Oily ☐ Flow Line	:	VEGGIE DENSITY: None Normal Inhibited	PIPE BENTHIC GROWTH:       None         Brown       Orange       Green         Other:       POOL QUALITY:       No pool			
Corrosion Sulfic Other: Other		Paint Other:		Excessive Other:			Colors Oils	
	DR:   Classification     BIDITY:   No     TABLES:   No	ne Slight Cloudines	ss 🗌	Cloudy Opaque		Red 🗌 Othe		
	ccess Trash (paper/p eeds Regular Maint	• / _	ımping ( nk Erosi		Sedimentati	on		
POTENTIAL RESTOR	AATION CANDIDA	<b>TE</b> Discharge invest		Stream daylighting [	Local str	eam repair/out	fall stabilization	
If yes for daylighting Length of vegetative co		ft Type o		and the second sec		Slope:	0	
If yes for stormwater Is stormwater currently	controlled?		Jse descr vailable:	· · · · · · · · · · · · · · · · · · ·				
SEVERITY: Concernent (circle #)	ompared to the amount tream; discharge appear ignificant impact downst	of discharge is significant of normal flow in receiving s to be having a ream.	Small discharge; flow mostly clear and odorless. If the discharge has a color and/or odor, the amount of discharge is very small compared to the stream's base flow and any impact appears to be minor / localized.			ing; or appearance		
SKETCH/NOTES:	5	4		3		2		
				K	EFORIED IC	AUTHORITIES	S: YES NO	

C

			Sto	orm Water Outfalls	ΟΤ
WATERSHED/SUBSHE	D:		DATE://	_ ASSESSED BY:	
SURVEY REACH ID:	M-12-01 1	'IME: <u>1:45</u> AM/PM)	Рното ID: (Camera-F	Pic #) 30 /#	**
SITE ID (Condition-#): C	DT- <u>02</u> L	AT 41 • 44 • 36 2 ··	LONG 72 . 26 . 12.		GPS: (Unit ID)
BANK: LT RT Head FLOW: None Trickle Moderate Substantial	TYPE: Closed pipe Open	MATERIAL: Concrete Med PVC/Plastic Brid Other: Concrete E Earth	k Elliptical Triple Other:	Diameter: <u>(in)</u> Depth: <u>(in)</u>	SUBMERGED:
Other:	channel	Other:	Other:	Width (Top): <u>(in)</u> " (Bottom): <u>(in)</u>	NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: NO Gas Sewage Rancid/Sour Sulfide Other:	DEPOSITS/STAINS: None Oily Flow Line Paint Other:	VEGGIE DENSITY: None Normal Inhibited Excessive Other:	PIPE BENTHIC GRO	e 🗌 Green ] No pool ]Colors 🗍 Oils
CONCERNS: Nee POTENTIAL RESTORA no If yes for daylighting:	ITY: Nor NBLES: Nor ess Trash (paper/p ds Regular Mainte TION CANDIDAT	ne       Slight Cloudiness         ne       Sewage (toilet papelastic bags)         lastic bags)       Dump         nance       Bank         E       Discharge investiga         Storm water retrofit	Cloudy Opaque or, etc.) Petroleum ing (bulk) Excessive Erosion Other:  tion Stream daylighting Other:	e Sedimentation	her:
If yes for stormwater: Is stormwater currently of		ft Type of e		Slope:	0
Yes No Not		Area avail	description:able:		
SEVERITY: com (circle #) stre	ivy discharge with a dia ng smell. The amount pared to the amount c am; discharge appears ificant impact downstr	of discharge is significant f normal flow in receiving to be having a	all discharge; flow mostly clear and o harge has a color and/or odor, the ar harge is very small compared to the and any impact appears to be minor	mount of discharge; st	not have dry weather aining; or appearance ay erosion problems.
	5	4	3	2	1
SKETCH/NOTES:				REPORTED TO AUTHORIT	ies: 🗌 yes 🗌 no

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F				Storm Water	Outfalls	ΟΤ		
WATERSHED/SUBSH	ED:		DATE:/	DATE:// ASSESSED BY:				
SURVEY REACH ID:	MT2-01	ТIME: <u>3</u> : 00 АМ/РМ	Рното ID: (Са	amera-Pic#) 3	/#			
SITE ID (Condition-#);	от- <u>15</u>	LAT 4 • 36.	"LONG 12 . 25	<u>'R.2</u> " LMK_	GI	<b>PS:</b> (Unit ID)		
BANK: LT RT Head FLOW: None Trickle Moderate Substantial	Closed pipe	MATERIAL: Concrete I PVC/Plastic I Other: Concrete Ea	Metal X Circular Brick Elliptical Other: Trapezoid	Single <b>DIMENS</b>   Double Triple Diameter Depth:		SUBMERGED: No Partially Fully		
Other:	channel	Other:	Parabolic Other:	Width (Top): " (Bottom):		NOT APPEICABLE		
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: [] N [] Gas [] Sewage [] Rancid/So [] Sulfide [] Other:	□ None □Oily	: VEGGIE DENSI	TY: PIPE BEN Brown Other: POOL QU Good [	THIC GROW	☐ Green No pool Colors ☐Oils		
<b>OTHER</b> Ex	DITY: 1 TABLES: 1 cess Trash (pape eds Regular Mai	ntenance 🗌 Ba	ss Cloudy O paper, etc.) Pe umping (bulk) E:	reen Orange paque paque troleum (oil sheen) xcessive Sedimentatic ther:	Othe	ri		
If yes for daylighting:		Storm water retro						
Length of vegetative co		ft Type c	of existing vegetation:		Slope:	0		
If yes for stormwater: Is stormwater currently Yes No No	controlled? t investigated	Area av	Jse description:			×		
SEVERITY: cc (circle #) st	ong smell. The amo	int of normal flow in receiving ears to be having a	Small discharge; flow mostly c discharge has a color and/or or discharge is very small compar flow and any impact appears to 3	dor, the amount of red to the stream's base b be minor / localized.	discharge; stain	have dry weather ing; or appearance prosion problems.		
SKETCH/NOTES:					<u>.</u>	1		
	Do inde	prod Dry Dry		<b>Β</b> ΕΡΟΡΤΕD ΤΟ	) <b>4</b> 1/THODITIE	:: □ YES □ NO		

C.

				St	orm Water	⁻ Outfalls	ΟΤ	
WATERSHED/SUB	SHED: MIDDLe Ton	Keihsosen Ri	142	DATE: 6/4/0	0% ASSE	SSED BY .	JS, GA	L
SURVEY REACH I		IME::AM/PN		PHOTO ID: (Camera-		/#	J2, 64	
SITE ID (Condition-				NG 1/ 027. 157.7	-	I	GPS: (Unit ID)	
BANK: LT RT He FLOW: None Trice	Closed pipe	MATERIAL:	]Metal  Brick	SHAPE: Single Circular Doub Elliptical Triple	le		SUBMERGED:	
Moderate Substantial Other:	Open channel	Concrete E	arthen	• • •	Depth: Width (Top): " (Bottom):		NOT APPEICABLE	~
CONDITION: None Chip/Cracked Peeling Paint	ODOR: No Gas Sewage Rancid/Sour	DEPOSITS/STAINS	s:	VEGGIE DENSITY: Mone Normal Inhibited	Brown Other:	Oranj	OWTH: ☑ None ge □ Green	
Corrosion Other:	Sulfide	Paint Other:		Children Chi	Good 🗌	JALITY: [ Odors [ Algae [		
FLOWINGTuONLYFLOOTHERI	LOR: Cler RBIDITY: Non DATABLES: Non Excess Trash (paper/pl Needs Regular Mainter	e Slight Clouding e Sewage (toilet astic bags) D	ess [	Cloudy     Opaque       tc.)     Petroleun       (bulk)     Excessiv	e Sedimentati	On O	ther: ther: /ard-Unlunown	purpose
POTENTIAL RESTO	DRATION CANDIDAT	E Discharge inves		Stream daylighting	* *	1		
If yes for daylightin	-	1115-111-11-11-11-11-11-11-11-11-11-11-1						_
Length of vegetative	cover from outfall:	ft Type	of existin	ng vegetation:		Slope:	0	
If yes for stormwath Is stormwater current Yes No	ly controlled?		Use desc wailable	· ·····				
OUTFALL SEVERITY: (circle #)	Heavy discharge with a dis strong smell. The amount of compared to the amount of stream; discharge appears significant impact downstre	of discharge is significant normal flow in receiving to be having a	discharge discharge	scharge; flow mostly clear and e has a color and/or odor, the a e is very small compared to the any impact appears to be mind	amount of e stream's base	discharge; s	not have dry weather staining; or appearance any erosion problems.	
SKETCH/NOTES:	5	4	1	3		2	1	
SKETCH/TOTES;								
					REPORTED TO	O AUTHORIT	TIES: YES NO	

Trash and Debris

•

	MODE				
WATERSHED/SUE	SHED: TAWLERHOC	isen River	DATE:	108	ASSESSED BY: 16, 77, 32, 64
JURVEY REACH I		<b>ТІМЕ:</b> :_ <i>8</i> 0_АМ/РМ	Рното ID: (Ca	amera-Pic #) 23	
SITE ID: (Condition	9-#) <b>TR-<u>()</u> </b> LAT <u>↓</u>	11 • 49 • 36.0 " LON	<u>6 28 · 22</u>	<u>.</u> " LMK	GPS: (Unit ID)
TYPE: ☐ Industrial 〕∑Commercial ☐ Residential		nstruction I Medical	SOURCE:	LOCATION: Stream Riparian Are Lt bank Rt bank	a LAND OWNERSHIP:
POTENTIAL REST		☐ Stream cleanup	am adoption segment	t 🗌 Removal/pre	evention of dumping
If yes for trash or debris removal	EQUIPMENT NEEDED:       Heavy equipment       Trash bags       Unknown       DUMPSTER WITHIN 100 FT:         WHO CAN DO IT:       Ovolunteers       Local Gov       Hazmat Team       Other       Yes       No       Unknown				
CLEAN-UP POTENTIAL: (Circle #)	A small amount of trash (i.e., than two pickup truck loads) loca inside a park with easy access	less with oney popper. Troch	it could be cleaned up i	ver A large amount area, where acc	t of trash or debris scattered over a large cess is very difficult. Or presence of drums hazardous materials
NOTES:	BIUE PIDE	STIC 55 S	PILON BOST	REL DR	um .
	DO NUT	D ZYKO KNOW IF	BOZZUL	C B Seck Reported	D OR OPer TO AUTHORITIES □ YES \$ NO

TR

Trash and Debris

WATERSHED/SUI	SSHED: Missole Tenk	crhoosen TZN.	DATE: <u>6 / 4</u>	106 1	ASSESSED BY: JS, 6A JK	
<b>JURVEY REACH</b>		TIME: <u>2</u> : <u>3</u> AM/PM			1# 28,29	
SITE ID: (Condition	и#) TR- <u>02</u> Lat <u>4(</u>	<u>• 44 '363 " Lon</u>	c <u>72 • 24 • 15.4</u>	'' LMK	GPS: (Unit ID)	
TYPE: Industrial Commercial Residential	Appliances Yar	struction Medical	SOURCE:	LOCATION:	LAND OWNERSHIP: Public Unknown Private AMOUNT (# Pickup truck loads): 2 6 ~ 3	
POTENTIAL REST	TORATION CANDIDATE			Removal/prev		
If yes for trash or debris removal	EQUIPMENT NEEDED:       Heavy equipment       Trash bags       Unknown       DUMPSTER WITHIN 100 FT:         WHO CAN DO IT:       Volunteers       Local Gov       Hazmat Team       Other       Yes       No       Unknown					
CLEAN-UP POTENTIAL: (Circle #)	A small amount of trash (i.e., le than two pickup truck loads) locate inside a park with easy access	with easy access. Trash r	or bulk items, in a small are nay have been dumped ov it could be cleaned up in small backhoe.	area, where acce	of trash or debris scattered over a large ess is very difficult. Or presence of drums hazardous materials	
NOTES:	WE WEIZE TO	(1) By NEI(1)	3 ars of si-	2 TE TUATI	KERDA DPW	
	CAME OUT 7	O Remove B	LANCE DAM	J. DEER	KENN DPW is was piled	
	side was	side of Si removed B	Tream change a	nnel. Del Iners. D	bris on resident	
 - 	Side was	LEFT.	, 		TO AUTHORITIES TYES NO	

TR

Trash and Debris

WATERSHED/SUB	shed: Missle	Tankerhoose	N RIVER	DATE: <u>6</u> /	4108	ASSESSED BY: JS, GA		
JURVEY REACH I	D: MTTZ-01		<u> 3 : 20</u> ам/рм	РНОТО ID: (Ca	mera-Pic #)	/#		
SITE ID; (Condition	SITE ID: (Condition=#) TR-D'5 LAT 4/ ° 49 ' 380 " LONG 72 ° 256 '0054 " LMK GPS: (Unit ID)							
TYPE: Industrial Commercial Residential	MATERIAL: Plastic Tires Appliances Automotive	Paper Construction Yard Waste Other:	Metal Medical Five gollow 10, crosser StrcAM	SOURCE:	LOCATION:			
POTENTIAL REST	ORATION CANDID			am adoption segment	Removal/pr	evention of dumping		
If yes for trash or debris removal	EQUIPMENT NEED	- /		Frash bags ☑ Unkno Gov ☑ Hazmat Te		DUMPSTER WITHIN 100 FT:		
CLEAN-UP POTENTIAL: (Circle #)	A small amount of tras than two pickup truck lo inside a park with easy	bads) located a long	asy access. Trash	or bulk items, in a small a may have been dumped o i it could be cleaned up in small backhoe.	ver A large amour area, where ac	it of trash or debris scattered over a large ccess is very difficult. Or presence of drums of hazardous materials		
	(5)		4	3	2	1		
NOTES: ARE (NORED AND SUNK INTO THE RIVER BOTTOM ARE (NORED AND SUNK INTO THE RIVER BOTTOM								
		uckets 7	0702 1	MAYBE MOT	28	D TO AUTHORITIES 🗌 YES 💆 NO		

TR

Reach Level Assessment RCH

SURVEY REACH I	e: <u>3 : 45</u> am/pr	$\mathbf{T} \mathbf{LMK:} $		DATE: <u>6</u> <u>4</u>	= 1  LMK:	5 + GAC
LAT 41 º 49 · 1		2.27 '5.5"	LAT 410 49	37.4 " LONG 7	2027 50	<u>).9</u> "
Description: 57			DESCRIPTION:	Wel ROAD C.	1 Junn	
	Lect (	Branch	/⊻			I
RAIN IN LAST 24 HO	•	🕅 Steady rain	PRESENT CONDITIONS	5		n 🗆 Intermittent
□ None					Overcast	Partly cloud
SURROUNDING LANI		l 🗆 Commercial arse 🗆 Park	□ Urban/Residential □ Crop	Suburban/Res	□ Forested Ø-Other: //r	□ Institutional
AVERAGE	CONDITIONS (che	ck applicable)	REACH	SKETCH AND SI	ГЕ ІМРАСТ Т	RACKING
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	□ 50%-75% ☑ 75-100%	within the survey re	of survey reach. Tra each (OT, ER, IB,SC, deemed appropriate.	UT, TR, MI) as v	vell as any additiona
DOMINANT SUBSTRA Silt/clay (fine or sild) Sand (gritty) Gravel (0.1-2.5)	slick) 🗆 C	obble (2.5 –10") oulder (>10") ed rock		TF T		
WATER CLARITY	aturally colored) 🛛					
AQUATIC PLANTS IN STREAM		$\begin{array}{c c} \square \text{ some } \square \text{ lots} \\ \blacksquare \text{ some } \square \text{ lots} \\ \end{array}$				
Wildlife in or Around Stream	(Evidence of) □ Fish □ Beav □ Snails □ Othe					
STREAM SHADING (water surface)	☐ Mostly shaded ☑ Halfway (≥50% ☐ Partially shaded ☐ Unshaded (< 2:	d (≥25% )	SI/D	20ad Do ot		
CHANNEL	Downcutting	Bed scour		pro-		
DYNAMICS	Widening	Bank failure				
Unknown	Headcutting Aggrading Sed. depositio	Bank scour Slope failure n Channelized	Lawr			
	Height: LT bank	<u>3(ft)</u>		$\sum_{i=1}^{n}$	1-42	
CHANNEL DIMENSIONS	RT bank	(ft)		encode (State Processory or	S.	
(Facing downstreaM)	Width: Bottom	(ft)	<u>k</u>	1 1 20	2 3	
2 5 11 1152 AUSTRAL)	Тор	(ft)	_ × /		E S	
B	EACH ACCESSIBILI			Z W		
Good: Open area in public ownership, sufficient room to stockpile materials,	Fair: Forested or developed area adjacent to stream. Access requires tree	Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to		MANNE HEW	1.7	
easy stream channel access for heavy equipment using existing roads or trails.	removal or impact to landscaped areas. Stockpile areas small or distant from stream.	stockpile available and/or located a great distance from stream. Specialized heavy equipment required.				
5 4	4 (3)	2 1		photo		
NOTES: (biggest prob	olem you see in survey	reach)		A.		

	Optimal	Suboptimal	Marginal	Poor	
HABITAT (May modify criteria based on appropriate	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	adequate habitat for maintenance of populations; presence of additional	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
habitat regime)	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0	
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	(2) 1 0 Active downcutting; tall banks on	
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	both sides of the stream eroding at a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	not able to enter floodplain. Stream deeply entrenched.	
	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
		ALL BUFFER AND FLOODPLA	IN CONDITION		
<u></u>	Optimal	Suboptimal	Marginal	Poor	
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.	
	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 (3)	2 1 0	
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6		
FLOODPLAIN	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water	
HABITAT		15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0	
	20 19 18 17 16		Moderate floodplain	Significant floodplain encroachment (i.e. fill material,	
	20 19 18 17 16 No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	effect on floodplain function	land development, or man-made structures). Significant effect on floodplain function	
HABITAT FLOODPLAIN ENCROACH-	No evidence of floodplain encroachment in the form of fill material, land development, or	form of fill material, land development, or manmade structures,	filling, land development, or manmade structures, some	land development, or man-made structures). Significant effect on	

					Sto	rm Water	Outfalls	ΟΤ
1	WATERSHED/SUBS	HED: Middle	Tank		DATE: <u>6 / 4 / 0</u>	S Asses	SED BY: F	riends
	SURVEY REACH ID	: MTR 02	TIME: 4 : 19 AM/P	M)	Рното ID: (Camera-P		/#	
	SITE ID (Condition-#)	: OT- <u>01</u>	LAT 41 049 .37	<u>, '</u> '' Lo	DNG72 ° 27 '50.9	" LMK_	G	PS: (Unit ID)
	BANK: LT RT Hea FLOW: None Trick	Closed	MATERIAL: Concrete PVC/Plastic Other:	]Metal ]Brick	SHAPE: Single Circular Double Elliptical Triple Other:	DIMENS Diameter:		SUBMERGED: No Partially Fully
	Moderate Substantial Other:	Dpen channel	Other:	arthen	Parabolic V	Depth: Vidth (Top): " (Bottom):		NOT APPEICABLE
	CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: ⊠ N □Gas □ Sewage □Rancid/So □ Sulfide □ Other:	☑ None □Oily	s:	VEGGIE DENSITY: None Normal Inhibited Excessive Other:	Brown Other: POOL QU Good [	THIC GROW	No pool Colors □Oils
	ONLY FLO	BIDITY:	Ione Slight Cloudin Ione Sewage (toilet /plastic bags) D	ess [	(bulk) Excessive		Othe	
	POTENTIAL RESTOR	RATION CANDIDA	ATE Discharge inve		n 🗌 Stream daylighting	Local stre	am repair/out	fall stabilization
	If yes for daylighting Length of vegetative c If yes for stormwated	over from outfall:	ft Type	of existi	ng vegetation:		Slope:	0
	Is stormwater currently			Use dese available	cription:			
	OUTFALL Heavy discharge with a strong smell. The amo		distinct color and/or a int of discharge is significant at of normal flow in receiving ears to be having a stream.	Small dis discharg discharg	scharge; flow mostly clear and o le has a color and/or odor, the ar le is very small compared to the s any impact appears to be minor	mount of stream's base		ing; or appearance erosion problems.
F	SKETCH/NOTES:		5	+	3	2	2	1
					I	Reported to	AUTHORITIE	S: 🗌 YES 🗌 NO



WATEDSUED	SUBSHED: Middle Ta	nb		DATE: 10	14108	Acces	SSED BY: Frilno's	
	CHID: MTR-02	TIME: 4:19			): (Camera-Pie		/#	
	dition-#) SC- <u>O</u> LAT		<u>4</u> " Long			MK	GPS (Unit ID)	
				<u> </u>				
TYPE: Roa	ad Crossing 🔲 Railroad Crossi	ng 🔲 Manmade I	Dam 🗌 Beave	er Dam 🔲	Geological For	mation 🔲	Other:	
For Road/ Railroad Crossings	SHAPE: Arch Bottomless Box Elliptical Circular Other: CONDITION: (Evidence of)	# BARRELS: Single Double Triple Other:	MATERIAL: Concrete Metal Other:	Flow-aligned		Barrel dia	Height: $L = 5.5'$ (ft) R = 4.0'	
ONLY	Cracking/chipping/corrosion	n 🔲 Downstrean		Fla	CULVERT SLOPE: $\square$ Flat $\square$ Slight (2° – 5°) $\square$ Obvious (>5°)		Width: $L = \frac{13}{13}$ (ft) R = 13 Roadway elevation: $\frac{10}{13}$ (ft)	
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re		•	placement 🔲 🛛	Upstream sto	orage retrofit	
IS SC ACTING	G AS GRADE CONTROL	No Ye	es 🗌 Unki	nown				
	EXTENT OF PHYSICAL BLO	CKAGE:	( <u> </u>	BLC	CKAGE SEVER	RITY: (circl	e #)	
If yes for fish barrier	Total Partial     Temporary Unknow CAUSE:     Drop too high Water Da     Flow too shallow Water Da     Other:	-op:(in)	road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish inter		A total fish blocka tributary that wou significant reach or partial blockag interfere with the anadromous fish.	ld isolate a of stream, e that may migration of	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.	
NOTES/SKET			5		4 3		2 1	
					REPOR	TED TO AUT	HORITIES TYES	
							1	

	Reach Level Assessment RCH
SURVEY REACH ID: MTE-OF WTRSHD/SUBSHD: MID	DATE: 6/5/08 ASSESSED BY:
START         TIME: 12 : 45 AM/RD         LMK:           LAT 41 ° 49 '357 "         LONG 72 ° 27 '51.8"	ENDTIME: $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ $4$ <th< th=""></th<>
DESCRIPTION: Jungel ROAD CULVERT	DESCRIPTION: Conference of Tank & Clark Grack
RAIN IN LAST 24 HOURS   Heavy rain   Steady rain     None   Intermittent   Trace	PRESENT CONDITIONS          □ Heavy rain          □ Steady rain          □ Intermittent         □ Clear         □ Overcast          □ Partly cloudy         □         □         □
SURROUNDING LAND USE: A Industrial PACT Commercial	· · · · · · · · · · · · · · · · · · ·
AVERAGE CONDITIONS (check applicable)	REACH SKETCH AND SITE IMPACT TRACKING
Base Flow as %         □ 0-25%         □ 50%-75%           Channel Width         □ 25-50 %         □ 75-100%	Simple planar sketch of survey reach. Track locations and IDs for all site impacts within the survey reach (OT, ER, IB,SC, UT, TR, MI) as well as any additional features deemed appropriate. Indicate direction of flow
DOMINANT SUBSTRATE         Silt/clay (fine or slick)         Sand (gritty)         Gravel (0.1-2.5")	
WATER CLARITY Q Clear □Turbid (suspended matter) □ Stained (clear, naturally colored) □ Opaque (milky) □ Other (chemicals, dyes)	an costs
AQUATIC PLANTS       Attached: 10 none       some       lots         IN STREAM       Floating: 10 none       some       lots	true rose som
WILDLIFE IN OR AROUND STREAM Stream Stream Stream Stream Deer	is z.
STREAM SHADING (water surface) $\square$ Mostly shaded ( $\geq$ 75% coverage) $\square$ Halfway ( $\geq$ 50%) $\square$ Partially shaded ( $\geq$ 25%) $\square$ Unshaded ( $<$ 25%)	
CHANNEL Downcutting Bed scour DYNAMICS Widening Bank failure Headcutting Bank scour	E al capit
Unknown Aggrading Slope failure Sed. deposition Channelized	HE SANT / 14 St
CHANNELHeight: LT bank7.5(ft)DIMENSIONSRT bank3.5(ft)	× 1864-1 3.54
(FACING Width: Bottom 1/3 5 (ft)	1 Brann
$\frac{DOWNSTREAM}{Top} \qquad Top \qquad \frac{5.5}{(ft)}$	1 more
REACH ACCESSIBILITY	18.34
Good: Open area in public ownership, sufficient room to stockpile materials,         Fair: Forested or developed area adjacent to stream. Access requires tree         Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to	( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )
easy stream channel access for heavy equipment using existing roads or trails small or distant from existing roads or trails	1.51 - 16 St (2.5 SK APAL
(5)         4         3         2         1	A A
NOTES: (biggest problem you see in survey reach)	TUNNEL ROAD DOVAR CUVERT
	Reported to Authorities TYES

	Optimal	Suboptimal	Marginal	Poor	
IN-STREAM HABITAT (May modify criteria based	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
on appropriate habitat regime)	colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	not yet prepared for colonization (may rate at high end of scale).	alsturded or removed.		
	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
VEGETATIVE PROTECTION         More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
	Left Bank 10 🧐	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	<u>8</u> 76	5 4 3	2 1 0	
FLOODPLAIN Connection	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	
	20 19 (18)17 16	15 14 13 12 11 ALL BUFFER AND FLOODPLAI	10 9 8 7 6	5 4 3 2 1 0	
<u></u>					
	Optimal	Suboptimal	Marginal	Poor	
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.	
	Left Bank (10) 9	8 7 6	5 4 3	2 1 0	
	Right Bank (10) 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN VEGETATION	a recommand needplain vegetation type in recommand noodplain vegetation		Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetatior type is turf or crop land	
	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function	
	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	

		R	each Level Assessn	nent RCH
SURVEY REACH ID: MARLO	WTRSHD/SUBSHD: Mit	ole Tank. R.	DATE: <u>615108</u>	Assessed by:
	AM/PM LMK: LONG 71.º 27 '28.4' J. CLARK BROKT TAN	END TIME:		1 Stand St
RAIN IN LAST 24 HOURS  Heaven	vy rain	PRESENT CONDITIONS	☐ Heavy rain ☐ Stea ☐ Trace ☐ Ove	idy rain □ Intermittent ercast □ Partly cloudy
SURROUNDING LAND USE:	ndustrial 🗆 Commercia folf course 🗆 Park	Urban/Residential	□ Suburban/Res 【Fore	
AVERAGE CONDITIO	NS (check applicable)	REACH	SKETCH AND SITE IMPA	
BASE FLOW AS %         □ 0-25%           CHANNEL WIDTH         □ 25-50 %	□ 50%-75% %   ⊠ 75-100%	within the survey red	of survey reach. Track locatic ach (OT, ER, IB,SC, UT, TR, I deemed appropriate. Indicate	
DOMINANT SUBSTRATE ☐ Silt/clay (fine or slick) ☐ Sand (gritty) ⊠ Gravel (0.1-2.5")	⊠ Cobble (2.5 –10") □ Boulder (>10") □ Bed rock		The Kerhoszert	TOGRINAN
WATER CLARITY Clear				1 mbstard
	$\square$ none $\square$ some $\square$ lots $\square$ none $\square$ some $\square$ lots			- Jore
	f) Beaver Deer Other: Sonfarson ( R. P.C. 1570	)		
STREAM SHADING 🛛 Halfway	shaded (225%)	Cicle	a Hu	9
CHANNEL Downcr DYNAMICS Wideni Unknown Aggrad	ng Bank failure tting Bank scour ing Slope failure	Confluence B Clark Brook Much Society is reported a	Hoppens	
Sed. de	position Channelized	TIS DERICES O	N MORE 10	£4
CHANNEL Height: LT	the second secon			1
(FACING Width: Bc			$\sim$	
DOWNSTREAM) VIAMIL DO			1. Serting	
REACH ACCES	SSIBILITY		J.	
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel	a wetland, steep slope, or eam. sensitive areas to get to es tree stream. Few areas to pact to stockpile available			
access for heavy equipment using existing roads or trails.	s distance from stream.		15 fr	
5 4 (3)	2 1	1		
NOTES: (biggest problem you see in	survey reach)			
1				
			<b>Β</b> ΕΡΩΡΤΈΝ ΤΟ Α	UTHORITIES 🗆 YES 🕅 N
	THE REPORT OF THE PARTY OF THE		MET OKIED IO A	

	Optimal	Suboptimal	Marginal	Poor	
IN-STREAM HABITAT (May modify criteria based on appropriate	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
habitat regime)	that are <u>not</u> pew fall and <u>not</u> transient). 20 (19) 18 17 16	rate at high end of scale).	10 9 8 7 6		
VEGETATIV			10 9 8 7 6	5 4 3 2 1 0	
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	d by native vegetation, including nderstory shrubs, or nonwoody hytes; vegetative disruption grazing or mowing minimal or lent; almost all plants allowed to		Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
	Left Bank (10) 9	8 7 6	5 4 3	2 1 0	
	Right Bank (10) 9	8 7 6	5 4 3	2 1 0	
BANK     Banks stable; evidence of erosion       Constraint     Constraint       (facing downstream)     <5% of bank affected.		Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.	
	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0	
	Right Bank (10 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	
	20 (19)18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
		ALL BUFFER AND FLOODPLA	N CONDITION		
	Optimal	Suboptimal	Marginal	Poor	
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 0 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water	
	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures 20 (19)18 17 16	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function	
		15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	

		Re	each Level As	sessment	RCH
SURVEY REACH	D: MT2-9 WTRSHD/SUBSHD: Min	P To Kalan P	DATE: <u>614</u>		SSED BY:
<u>}</u>	$\frac{1}{1000}$	END TIME:	: 12 AM/PM		<u>15, 64, 767</u> GPS ID:
LAT 4 10 49 1		LAT <u>41 ° 49 '2</u>		2º 27 : 43	
	TreAM DNIDE TRINTOLOGO			tream Cro	
	The second		UNEL KA D	IRAM UV	- June
RAIN IN LAST 24 HC □ None	URS □ Heavy rain 🖾 Steady rain □ Intermittent □ Trace	PRESENT CONDITIONS	□ Heavy rain □ Trace		
	DUSE: Industrial Commercial	Urban/Pegidential N			Partly cloudy     Institutional
	$\Box \text{ Golf course } Park for the form$	Crop	☐ Pasture	Other: We	
Average	CONDITIONS (check applicable)	REACH S	SKETCH AND SIT	TE IMPACT TR	ACKING
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □ 50%-75% □25-50 % ☑ 75-100%	Simple planar sketch o within the survey rea			
		features a	leemed appropriate.	Indicate airection	n of flow
<b>DOMINANT SUBSTR</b> Silt/clay (fine or		400 - VAC	(CW AVE	T	TUNNEL
Sand (gritty) Gravel (0.1-2.5	$\Box \text{ Boulder } (>10")$	07-1	39/101-	040	C RD
	· / ·	07-06-		50	-04
	Clear DTurbid (suspended matter)	•• ••	( Cingo		
$\Box$ Other (chemicals,	aturally colored)   Opaque (milky) dyes)	69 ¹	Por spring		
AQUATIC PLANTS	Attached: 🗹 none 🗆 some 🗆 lots	- 51	12		
AQUATIC PLANTS IN STREAM	Floating: $\square$ none $\square$ some $\square$ lots			1	1. malla
WILDLIFE IN OR	(Evidence of)		,	1	Survey sparst
AROUND STREAM	□ Fish □ Beaver ☑ Deer □ Snails ☑ Other: ℝQ.ccoor		07-07	1	Wer /
/	☐ Mostly shaded (≥75% coverage)	·			1/m
STREAM SHADING (water surface)	□ Halfway (≥50%)	55-	- )		C Per
(water surrace)	□ Partially shaded (≥25% ) □ Unshaded (< 25%)		Non-section and the sector of the sector and the sector and the sector of the sector o		Var
CHANNEL	Downcutting Bed scour		1 15-3	1	4
DYNAMICS	Widening Bank failure	5-19		tr	3 0 / 1075 0 D
	☐ Headcutting ☐ Bank scour ☐ Aggrading ☐ Slope failure			ſ	
Unknown	Sed. deposition	"Add Ageneration"	6.2		TS1-03
•	Height: LT bank (ft)	1 i ±	51-2-2		
CHANNEL DIMENSIONS	RT bank(ft)		g-, 14 -	12.03	
(FACING	Width: Bottom(ft)	(Burgers		NE	
DOWNSTREAM)	Top(ft)	ts		Cipt"	
R	EACH ACCESSIBILITY	jst TR-1 €€.			2001 Lor
Good: Open area in	Fair: Forested or developed area         Difficult. Must cross wetland, steep slope, or	and the second se		1	Plan
public ownership, sufficient room to	adjacent to stream. Sensitive areas to get to stream. Few areas to get to			N SP OUT	~
stockpile materials, easy stream channel	removal or impact to stockpile available	07-1 7	k K	R Broker	- Section and the section of the sec
access for heavy	landscaped areas. and/or located a great Stockpile areas distance from stream.		X.	v /	NE.
equipment using existing roads or trails.	small or distant from Specialized heavy				107-1
5 4			/	1	anne and the second
NOTES: (biggest prob	Tem you see in survey reach)		+	1	7
)					
					_ _/
	1		REPORT	FED TO AUTHOR	TIES YES NO

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	Optimal	Suboptimal	Marginal	Poor	
N-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.	
	20 19 18 17 16	15 14 (13)12 11	10 9 8 7 6	5 4 3 2 1 0	
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	ROTECTION         surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to         rowered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble         50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant		surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0	
	Right Bank 10 9	8 7 (6)	5 4 3	2 1 0	
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.	
	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0	
	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0	
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	
	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0	
		ALL BUFFER AND FLOODPLA	N CONDITION		
	Optimal	Suboptimal	Marginal	Poor	
Vegetated Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.	
	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
	Right Bank 10 9	8 7 6	5 4 3	2 1 0	
FLOODPLAIN         Predominant floodplain vegetation type           VEGETATION         is mature forest		Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land	
	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water	
	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0	
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function	
Ļ	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6		

		Storn	n Water Outfalls	ΟΤ	
WATERSHED/SUBSHED: MiDole	DATE: 615109	ASSESSED BY: J	SAR GARD		
SURVEY REACH ID: MTIZ-09	TIME: 10: 05AM/PM	PHOTO ID: (Camera-Pic		<u> </u>	
SITE ID (Condition-#): OT-10	LAT 41 . 49 . 27 8" LO	ONG 72 . 27 . 54.0"	LMK	GPS: (Unit ID)	
BANK:  TYPE:    LT  RT    Head    FLOW:    None    Trickle	MATERIAL: Concrete Metal PVC/Plastic Brick Other:	SHAPE: Single Circular Double Elliptical Triple	DIMENSIONS: Diameter: <u>),5 (in)</u>	SUBMERGED: No Partially Fully	
Substantial Open Other: channel	Concrete Earthen		oth: <u>(in)</u> dth (Top): <u>(in)</u> (Bottom): <u>(in)</u>	NOT APPEICABLE	
CONDITION:     ODOR: Interpretation       Image: None     Image: Gas       Image: Chip/Cracked     Image: Sewage       Image: Peeling Paint     Image: Rancid/Se	None Oily	None Normal	PIPE BENTHIC GRO Brown Drang Other:	WTH: None e Green	
Corrosion Sulfide	Paint Other:	Excessive     Other:	POOL QUALITY: [ Good Odors ] Suds Algae ] Other:	Colors Oils	
FOR       COLOR:       Clear       Brown       Grey       Yellow       Green       Orange       Red       Other:         FLOWING       TURBIDITY:       None       Slight Cloudiness       Cloudy       Opaque         ONLY       FLOATABLES:       None       Sewage (toilet paper, etc.)       Petroleum (oil sheen)       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation					
CONCERNS: Needs Regular Mai	ntenance 🗌 Bank Ero	osion Other:			
POTENTIAL RESTORATION CANDID	Storm water retrofit	Other:	Local stream repair/o	uttall stabilization	
If yes for daylighting:	, , , , , , , , , , , , , , , , , , ,				
Length of vegetative cover from outfall:	:ft Type of exist	ting vegetation:	Slope:	o	
If yes for stormwater: Is stormwater currently controlled?	Land Use des	scription:			
Yes No Not investigated	Area availabl	e:			
SEVERITY: strong smell. The amo	ant of orscharge is significant dischargent of normal flow in receiving dischargent discha	lischarge; flow mostly clear and odor ge has a color and/or odor, the amou ge is very small compared to the stre d any impact appears to be minor / lo	unt of discharge; sta	not have dry weather aining; or appearance ly erosion problems.	
	5 (4)	3	2	1	
SKETCH/NOTES: BLACK pipe Coming From Residence / priveway and Wokezen AVR. Undeak OF pulpase.					
IS this legal? Silty Discharge / Brown					
)			PORTED TO AUTHORIT		

Storm	Mator	Outfalls
VIO III	v v ator	Vullana

## ΟΤ

WATERSHED/SUBSHI	D: Middu T	Fank	DATE: 614106	ASSESSED BY: Fridad S
SURVEY REACH ID:		ME: <u>5:15</u> AM/PM)	PHOTO ID: (Camera-Pic #)	3
SITE ID (Condition-#):	DT- <u>Ol</u> LA	т41049 135.7" I	ONG 72027 154.8"	LMK GPS: (Unit ID)
BANK: LT RT Head FLOW: None Trickle Moderate	TYPE:	MATERIAL: Concrete Metal PVC/Plastic Brick Other:	Circular Double	DIMENSIONS: SUBMERGED:
Substantial	Open channel	Concrete Earthen	Parabolic Width	n:(in) h (Top):(in) NOT APPELCABLE Rottom):(in)
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: MNO Gas Sewage Rancid/Sour Sulfide Other:	DEPOSITS/STAINS: None Oily Flow Line Paint Other:	None     Normal     Inhibited     Excessive     Other:	IPE BENTHIC GROWTH: None Brown Orange Green Other: OOL QUALITY: No pool Good Odors Colors Oils Suds Algae Floatables Other:
<b>OTHER</b> Exc		Slight Cloudiness Sewage (toilet paper, stic bags)	Cloudy     Opaque       etc.)     Petroleum (oil       g (bulk)     Excessive Sed	
<b>POTENTIAL RESTOR</b> no If yes for daylighting:	ATION CANDIDATE	Discharge investigati	on Stream daylighting I I	Local stream repair/outfall stabilization
	ver from outfall:	ft Type of exi	ting vegetation:	Slope:°
If yes for stormwater: Is stormwater currently of Yes No No		Land Use de Area availat		
SEVERITY: co (circle #) str	avy discharge with a disti ong smell. The amount of mpared to the amount of i eam; discharge appears t inificant impact downstrea	discharge is significant normal flow in receiving o be having a	discharge; flow mostly clear and odorle rge has a color and/or odor, the amount rge is very small compared to the strear nd any impact appears to be minor / loca	of n's base of aquina any oragion problems
	5	4	(3)	2 1
SKETCH/NOTES:			Repo	DRTED TO AUTHORITIES: 🗌 YES 🗌 NO

Storm	Water	Outfalls
Q.01111	s s carcos	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

WATERSHED/SUBSH	ED: Middy -	Tank	DATE: 614 102	ASSESSED BY:	Friends		
SURVEY REACH ID: MTR 09 TIME: 5:32 AM/PM)			Рното ID: (Camera-Pic	Рното ID: (Camera-Pic #) /# 50			
SITE ID (Condition-#):	ОТ- <u>02</u> LA	т41 • 49 134,3 "	LONG 72 . 27 . 2.1 "		GPS: (Unit ID)		
	······	······································					
BANK: LT RT Head FLOW: None Trickl	Closed	MATERIAL: Concrete Met PVC/Plastic Bric Other:		DIMENSIONS: Diameter: (in)	SUBMERGED:		
Moderate Substantial	Open channel	Concrete Earthe	Parabolic Wi	pth: <u>(in)</u> idth (Top): <u>(in)</u> (Bottom): <u>(in)</u>	NOT APPENCABLE		
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR:  NO Gas Sewage Rancid/Sour Sulfide Other:	DEPOSITS/STAINS: None Oily Flow Line Paint Other:	VEGGIE DENSITY: None Normal Inhibited Excessive Other:	PIPE BENTHIC GRO Brown Orang Other: POOL QUALITY: Good Odors Suds Algae Other:	e 🗌 Green No pool Colors 🗌 Oils		
ONLY   FLOA     OTHER   E     CONCERNS:   N	IDITY: None TABLES: None Access Trash (paper/pla eeds Regular Mainten	e Slight Cloudiness e Sewage (toilet pape astic bags) Dump ance Bank I	Cloudy Opaque or, etc.) Petroleum ( ing (bulk) Excessive S Erosion Other:  .tion Stream daylighting	Sedimentation	her:		
If yes for daylighting							
Length of vegetative co	over from outfall:	ft Type of ex	kisting vegetation:	Slope: _	0		
If yes for stormwater Is stormwater currently Yes No N	controlled? ot investigated	Area avail	description:able:				
SEVERITY: (circle #)	leavy discharge with a dist trong smell. The amount or ompared to the amount of tream; discharge appears ignificant impact downstrea	f discharge is significant normal flow in receiving to be having a am.	all discharge; flow mostly clear and odd harge has a color and/or odor, the amo harge is very small compared to the str and any impact appears to be minor /	bunt of discharge; st of causing ar localized.	not have dry weather aining; or appearance ny erosion problems.		
SKETCH/NOTES:	5	4	(3)	2	1		
)			Ri	EPORTED TO AUTHORIT	ies: 🗌 yes 🗌 no		

				Storr	m Water Outfal	
WATERSHED/SUBSHI	ED: Middl	e Tank	DATE:	614108	ASSESSED BY	· Friends
SURVEY REACH ID:		TIME: 5 : 40 AM/P	м) Рното	ID: (Camera-Pic	terreturner terreturner	<u> </u>
SITE ID (Condition-#):	от- 03		Ung 720			GPS: (Unit ID)
BANK: LT RT Head FLOW: None Trickle Moderate	TYPE:	MATERIAL:	Othe	Ilar Double tical Triple	2° wide 10" high	SUBMERGED: M No in) Partially Fully
Substantial	Open channel	Concrete E	Earthen Trape	oolic Wi	pth: <u>(in</u> idth (Top): <u>(in</u> (Bottom): <u>(in</u>	NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: ☑ № □Gas □ Sewage □Rancid/Sc	□ None □ Oily our □ Flow Line	iS: VEGGII □ None ☑ Norm □ Inhib	nal		ROWTH: Mone ange Green
Corrosion	Sulfide	Paint Other:	Difference:		Good Odors	-
<b>OTHER</b> Ex		Vone 🗌 Slight Cloudir None 📄 Sewage (toilet r/plastic bags) 👘 🗍		Opaque	Orange Red	Other:
		·····			· · · · · · · · · · · · · · · · · · ·	
	ATION CANDID	ATE Discharge inve		m daylighting	] Local stream repa	ir/outfall stabilization
no Thursday India Lati	····	Storm water ret	trofit 🗌 Othe	r:		
<i>If yes for daylighting:</i> Length of vegetative co		ft Type	of existing vegeta	tion:	Slope	e:o
If yes for stormwater:						
Is stormwater currently		Land	Use description:			
Yes No No	t investigated	Area	available:			
SEVERITY: cc (circle #) sta	rong smell. The amo	a distinct color and/or a unt of discharge is significant nt of normal flow in receiving ears to be having a istream.	discharge has a colo discharge is very sm	v mostly clear and odo r and/or odor, the amo all compared to the stru appears to be minor / l	eam's base	oes not have dry weather e; staining; or appearance ng any erosion problems.
		5	4	3	2	(1)
Sketch/Notes:						
)			······	Re	EPORTED TO AUTHOR	RITIES: YES NO

				Storm Water	Outfalls OT
WATERSHED/SUBS	HED: Midd	« Tank	DATE: Le	14108 ASSE	SSED BY:
SURVEY REACH II		TIME:AM/P	м <b>Рното ID</b>	: (Camera-Pic #)	/#
SITE ID (Condition-#	: OT- <u>인닉</u>	LAT'	'' LONG°	'" LMK	GPS: (Unit ID)
		S/A SC-01			
BANK: LT RT Hea FLOW: None Trick	── ∑ Closed	MATERIAL:	SHAPE: Metal Circular Brick Elliptical Other:		, No
Moderate Substantial Other:	Open channel	Concrete E F	Earthen Trapezoi		
CONDITION: None Chip/Cracked	ODOR: 2 1 Gas Sewage	[]√None □Oily	NS: VEGGIE DI	Brown Other:	NTHIC GROWTH: Mone
Corrosion	Sulfide	Paint DOther:	Excessive     Other:	e Good	JALITY: MNo pool Odors Colors Oils Algae Floatables
FOR       COLOR:       Clear       Brown       Grey       Yellow       Green       Orange       Red       Other:         FLOWING ONLY       TURBIDITY:       None       Slight Cloudiness       Cloudy       Opaque         ONLY       FLOATABLES:       None       Sewage (toilet paper, etc.)       Petroleum (oil sheen)       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation         CONCERNS:       Needs Regular Maintenance       Bank Erosion       Other:					
POTENTIAL RESTORATION CANDIDATE       Discharge investigation       Stream daylighting       Local stream repair/outfall stabilization         no       Storm water retrofit       Other:					
If yes for daylighting Length of vegetative of	0	:ft Type	of existing vegetation	:	Slope:°
If yes for stormwate Is stormwater currentl	y controlled?		Use description: available:		
<b>SEVERITY:</b> (circle #)	strong smell. The amo	nstream.	discharge has a color and discharge is very small co	stly clear and odorless. If the l/or odor, the amount of ompared to the stream's base ars to be minor / localized.	Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems.
	n ann an a	5	4 3	3	2 1
Sketch/Notes:					
<u>)</u>				REPORTED TO	DAUTHORITIES: YES NO

			Sto	orm Water Outfal	Is <b>OT</b>
WATERSHED/SUBS	HED: Middle	Tank	DATE: 6 / 4 / 0	S ASSESSED BY	: Frinds
SURVEY REACH II		TIME: <u>5</u> : <u>5</u> 3AM/PM	PHOTO ID: (Camera-l		
SITE ID (Condition-#	o far is seen a far a see		"LONG 72 . 27 .55.0		GPS: (Unit ID)
BANK: LT MRT Hea FLOW: None Tricl Moderate	Closed	MATERIAL: Concrete Ma PVC/Plastic Br Other:	ick		SUBMERGED:
Substantial	Open channel	Concrete Eart		Depth:(in) Width (Top):(in) " (Bottom):(in)	NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: No	⊠ None □Oily	VEGGIE DENSITY:	Other:	ange 🔲 Green
Corrosion	Sulfide	☐ Paint ☐ Other:	Children Chi	POOL QUALITY:         Good       Odors         Suds       Algae         Other:	
FLOWINGTURONLYFLOOTHERI	LOR:     Cl       CBIDITY:     No       ATABLES:     No       Excess Trash (paper/       Needs Regular Main	one Slight Cloudiness one Sewage (toilet pa plastic bags) Dum	Cloudy     Opaque       per, etc.)     Petroleum	Orange Red	Other:
no If yes for daylightin	<i>g</i> :	Storm water retrof			
Length of vegetative of         If yes for stormwate         Is stormwater currentl         Yes       No         OUTFALL         SEVERITY:         (circle #)	er: ly controlled? Not investigated Heavy discharge with a o strong smell. The amour	Area ava distinct color and/or a at of discharge is significant of normal flow in receiving ars to be having a	e description:	mount of discharge	es not have dry weather s; staining; or appearance g any erosion problems.
SKETCH/NOTES:	5	4	3	2	
) .				Reported to author	RITIES: 🗌 YES 🗌 NO

BANK:       Image: Construction of the second	Storm Water Outfalls						
SURVEY REACH ID: MTC 0?       TIME: (p: 0 AM/b)       PHOTO ID: (Camera-Pic #)       /# 5(p)         STTE ID (Condution #): OT-0/0       LAT 1 0 1 25 5 " LONG 72 0 27 154 9 "       LMK       GPS: (Unit II         BANK:       TYPE:       NATERIAL:       SHAPE:       Single       DIMENSIONS:       SUBMERCE         BANK:       Closed       D'VC/Plastic       Brick       Eliptical       Triple       Dameter:       (n)       Partially         None       Open       Concrete       Barker       Other:       Other:       Dimensions:       SUBMERCE         Substantial       Open       Concrete       Barker       Other:       Depth:       (n)       Partially         Other:       Other:       Concrete       Earthen       Drapezoid       Depth:       (n)       NOT APPECAL         Moderate       Open       Concrete       Earthen       Other:       Width (Top):       (n)       NOT APPECAL         Moderate       Open       Concrete       Earthen       Depth:       (n)       NOT APPECAL         Other:       Open       Concrete       Earthen       Depth:       (n)       NOT APPECAL         Conscience       Sulfide       Other:       Other:       Brown       Orange	and DATE: 614108 Assessed BY:	Friends					
SITE ID (Condition:#): OT-202       LAT 1 • 10 · 12 · 12 · 12 · 12 · 12 · 12 · 12 ·	2 4-1 (1)	· · · · · · · · · · · · · · · · · · ·					
LT MRT       Head       Closed       Concrete       Metal       Circular       Double       Double       Diameter:       No         PLOW:       Dipe       Other:       Other:       Other:       Fully         Moderate       Open       Concrete       Earthen       Trapezoid       Depth:       (in)       Partially         Other:       Open       Concrete       Earthen       Parabolic       Width (Top):       (in)       No         Other:       Open       Concrete       Earthen       Parabolic       Width (Top):       (in)       No         Other:       Open       Concrete       None       None       Brown       Orange       Green         Other:       Open       Gas       None       None       None       Brown       Orange       Green         Other:       Peeling Paint       Rancid/Sour       Flow Line       Inhibited       POOL QUALITY:       No pool         Other:       Sulfide       Paint       Excessive       Other:       Pool Quality:       Pool Quality:       Pool Quality:       Pool Quality:       No         PLOWING       TURBIDITY:       None       Slight Cloudiness       Cloudy       Opaque       Other:		GPS: (Unit ID)					
LT MRT       Head       Closed       Concrete       Metal       Circular       Double       Double       Diameter:       No         PLOW:       Discover       Other:       Other:       Other:       Fully         Moderate       Open       Concrete       Earthen       Trapezoid       Depth:       (in)       Partially         Substantial       Open       Concrete       Earthen       Trapezoid       Depth:       (in)       Not APACAA         Other:       Open       Concrete       Earthen       Trapezoid       Depth:       (in)       Not APACAA         Other:       Open       Concrete       Barthen       Other:       "Boustantial       Nor         Other:       Open       Concrete       Barthen       Partially       Width (Top):       (in)       Nor         Mone       Gas       None       Bepositrs/Stains:       VecGEIE Densitry:       Brown       Onage       Green       Other:       Other:       Prebentic APACA         Peeling Paint       Rancid/Sour       Flow Line       Inhibited       Brown       Other:       Pool QUALITY:       No pool         Other:       Sulfide       Paint       Excessive       Other:       Other:       Ot							
FLOW:		SUBMERGED:					
Image: Substantial Substantial Other:       Open channel       Concrete Earthen other:       Trapezoid Depth:		、					
Moderate       Open       Concrete       Earthen       Trapezoid       Depth:       (in)         Other:       Other:       Other:       Width (Top):       (in)         Other:       Other:       "       (Bottom):       (in)         Mone       Gas       None       Status       None         Constructed       Sewage       Oily       None       Brown       Orange       Green         Peeling Paint       Rancid/Sour       Flow Line       Inhibited       POOL QUALITY:       No pool         Other:       Sulfide       Paint       Excessive       Other:       Other:         Other:       Other:       Other:       Other:       Other:       Other:         Sulfide       Paint       Excessive       Other:       Other:       Other:         Other:       Other:       Other:       Other:       Other:       Other:         Sulfide       Paint       Excessive       Other:       Other:       Other:         Other:       Other:       Other:       Other:       Other:       Other:         Mone       Slight Cloudiness       Cloudy       Opaque       Other:         OTHER       Excess Trash (paper/plastic bags) <td></td> <td></td>							
Substantial       Open       Concrete       Barthen       Parabolic       Width (Top):in)       Not Appendent         Other:       Other:       Other:       '' (Bottom):in)       Not Appendent         CONDITION:       ODOR:       No       DEPOSITS/STAINS:       YEGGIE DENSITY:       Pipe BENTHIC GROWTH:       None         Other:       Odor       Gas       Ooly       None       Brown       Orange       Green         Other:       Other:       Other:       Other:       Other:       Pool QUALITY:       No pool         Other:       Sulfide       Paint       Excessive       Good Odors       Colors       Other:         Other:       Sulfide       Paint       Green       Other:       Other:       Other:         Other:       Other:       Other:       Other:       Other:       Other:       Other:         Flow Une       Inhibited       Pool Qualify       Other:       Other:       Other:       Studs       Algae       Floatables         Other:       Slight Cloudiness       Cloudy       Opaque       Other:       Other:       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation       Other:	Trapezoid Depth (in)	$\sim$					
CONDITION:       ODOR: No       DEPOSITS/STAINS:       VEGGIE DENSITY:       PIPE BENTHIC GROWTH: Non         Mone       Gas       None       None       Brown       Orange       Green         Chip/Cracked       Sewage       Oily       Normal       Other:       Other:       Pool QUALITY: No pool         Corrosion       Sulfide       Paint       Excessive       Other:       Other:       Pool Quality: No pool         Other:       Other:       Other:       Other:       Other:       Other:       Pool Quality: No pool         Brown       Sulfide       Paint       Excessive       Good       Odors       Colors       Other:         Vertex       Other:       Other:       Other:       Other:       Other:       Dother:         For       Colors:       Clear       Brown       Grey       Yellow       Green       Orange       Red       Other:         FlowVING       TURBDITY:       None       Slight Cloudiness       Cloudy       Opaque       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation       Other:         ONCERNS:       Needs Regular Maintenance       Bank Erosion       Other:       Idvalighting:	Oncrete Earthen Parabolic with the second	NOT APPEICABLE					
Mone       Gas       None       None       Brown       Orange       Green         Chip/Cracked       Sewage       Oily       None       Brown       Orange       Green         Peeling Paint       Rancid/Sour       Flow Line       Inhibited       Pool QUALITY:       No pool         Corrosion       Sulfide       Paint       Excessive       Other:       Other:       Good       Odors       Colors       Good       Odors       Colors       Good       Other:         Other:       Slight       Other:       Other:       Other:       Other:       Other:       Other:         For       Color:       Ø Clear       Brown       Grey       Yellow       Green       Orange       Red       Other:         FlowING       TURBIDITY:       None       Slight Cloudiness       Cloudy       Opaque         ONLY       FLOATABLES:       None       Sewage (toilet paper, etc.)       Petroleum (oil sheen)       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation         ONCERNS:       Needs Regular Maintenance       Bank Erosion       Other:         Potential Restoration Candidate       Discharge investigation       Stream daylighting <td></td> <td></td>							
Chip/Cracked       Sewage       Oily       Introduction       Brown       Orange       Green         Pecling Paint       Rancid/Sour       Flow Line       Inhibited       Pool QUALITY:       No pool         Corrosion       Sulfide       Paint       Excessive       Good       Odors       Colors       Good       Odors       Colors       Image       Image <td></td> <td></td>							
Pecling Paint       Rancid/Sour       Flow Line       Inhibited         Corrosion       Sulfide       Paint       Inhibited         Other:       Other:       Other:       Other:         Sulfide       Paint       Excessive       Good Odors         Other:       Other:       Other:       Other:         Sulfide       Paint       Excessive       Good Odors         Other:       Other:       Other:       Other:         For       CoLOR:       Clear       Brown       Grey       Yellow         FLOATABLES:       None       Slight Cloudiness       Cloudy       Opaque         ONLY       FLOATABLES:       None       Sewage (toilet paper, etc.)       Petroleum (oil sheen)       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation         CONCERNS:       Needs Regular Maintenance       Bank Erosion       Other:         POTENTIAL RESTORATION CANDIDATE       Discharge investigation       Stream daylighting       Local stream repair/outfall stabilization         no       Storm water retrofit       Other:       Other:		ige 🔲 Green					
Corrosson   Other:   Only   FLOATABLES:   None   Storm water retrofit   Other:	Flow Line						
Other: Other:     Subs     Algae     For     Color:     Sight     Grey     Yellow     Green   Orange     Red   Other:     Other:     Flowing   TURBIDITY:     None   Slight Cloudiness   Cloudy   Opaque   FLoATABLES:   None   Sewage (toilet paper, etc.)   Petroleum (oil sheen)   Other:   Other:   Other:         Potential Restoration Candidate bags)   Discharge investigation   Stream daylighting            Image:     Image:              Storm water retrofit                                                                                                        <	$\square$ Excessive $\square$ Good $\square$ Odors						
FOR       COLOR:       Clear       Brown       Grey       Yellow       Green       Orange       Red       Other:         FLOWING       TURBIDITY:       None       Slight Cloudiness       Cloudy       Opaque       Opaque         ONLY       FLOATABLES:       None       Sewage (toilet paper, etc.)       Petroleum (oil sheen)       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation         CONCERNS:       Needs Regular Maintenance       Bank Erosion       Other:         POTENTIAL RESTORATION CANDIDATE       Discharge investigation       Stream daylighting       Local stream repair/outfall stabilization         Ino       Storm water retrofit       Other:         If yes for daylighting:       Storm water retrofit       Other:	U Other:						
FLOWING ONLY       TURBIDITY:       None       Slight Cloudiness       Cloudy       Opaque         ONLY       FLOATABLES:       None       Sewage (toilet paper, etc.)       Petroleum (oil sheen)       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation         CONCERNS:       Needs Regular Maintenance       Bank Erosion       Other:         POTENTIAL RESTORATION CANDIDATE       Discharge investigation       Stream daylighting       Local stream repair/outfall stabilization         no       Storm water retrofit       Other:         If yes for daylighting:       If yes for daylighting:       If yes for daylighting:							
CONCERNS:       Needs Regular Maintenance       Bank Erosion       Other:         POTENTIAL RESTORATION CANDIDATE       Discharge investigation       Stream daylighting       Local stream repair/outfall stabilization         no       Storm water retrofit       Other:         If yes for daylighting:       Storm water retrofit       Other:	FLOWING     TURBIDITY:     None     Slight Cloudiness     Cloudy     Opaque						
no     Storm water retrofit     Other:       If yes for daylighting:     Other:							
		outfall stabilization					
Length of vegetative cover from outfall: ft Type of existing vegetation global states of the state of the sta							
	ft Type of existing vegetation:Slope:	o					
If yes for stormwater:							
Is stormwater currently controlled? Land Use description:	Land Use description:						
Yes   No   Not investigated   Area available:	Area available:						
OUTFALL       Heavy discharge with a distinct color and/or a strong smell. The amount of discharge is significant compared to the amount of normal flow in receiving stream; discharge appears to be having a significant impact downstream.       Small discharge; flow mostly clear and odorless. If the discharge is very small compared to the amount of discharge is very small compared to the stream's base flow and any impact appears to be minor / localized.       Outfall does not have dry weath discharge; staining; or appearar of causing any erosion problems	rge is significant flow in receiving discharge has a color and/or odor, the amount of discharge is very small compared to the stream's base	staining; or appearance					
5 4 3 2 1	4 (3) 2	1					
Sketch/Notes:							
Reported to authorities: Yes	Reported to author	TIES: 🗌 YES 🗌 NO					

Storm	Water	Outfalls
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1	(	)	]	Γ

WATERSHED/SUBSHE	D: Middle T	ank	DATE: (01 51	0 8 ASSESSED BY: 7	STATE (+		
SURVEY REACH ID: MTR- 09 TIME: 9: 49 AM/PM				DATE: $(0 1 5 1 0 8)$ ASSESSED BY: $JS, TO, JK, CK$ PHOTO ID: (Camera-Pic #) $J$ /# /			
SITE ID (Condition-#):			LONG 720 27, '54-		GPS: (Unit ID)		
					<u> </u>		
BANK: LT RT Head FLOW: None	TYPE:	MATERIAL: Concrete Met PVC/Plastic Brid Other:		ble off	SUBMERGED: No Partially Fully		
Moderate Substantial Other:	Dpen channel	Concrete Earth	en Trapezoid Parabolic Other:	Depth:         (in)           Width (Top):         (in)           " (Bottom):         (in)	NOT APPEICABLE		
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: XNO Gas Sewage Rancid/Sour Sulfide Other:	DEPOSITS/STAINS: None Oily Flow Line Paint Other:	VEGGIE DENSITY:	PIPE BENTHIC GRO         Brown       Orange         Other:         POOL QUALITY:         Good       Odors         Suds       Algae         Other:	e □ Green No pool ]Colors □Oils		
	DITY: None	Slight Cloudiness Sewage (toilet pap stic bags)	Cloudy Opaque er, etc.) Petroleu	Orange Red Oth m (oil sheen) Oth ve Sedimentation			
POTENTIAL RESTORA no If yes for daylighting: Length of vegetative cov		Storm water retrofit	Other:	Local stream repair/ou			
If yes for stormwater:         Is stormwater currently c         Yes       No         OUTFALL       He         SEVERITY:       Str         (circle #)       str	ontrolled?	Land Use Area avail nct color and/or a discharge is significant ormal flow in receiving o be having a	description:	d odorless. If the e amount of he stream's base	ot have dry weather ining; or appearance y erosion problems.		
	5	4	3	2	1		
SKETCH/NOTES:				Reported to Authoriti	es: 🗌 yes 🖓 no		

				Storm Wate	r Outfalls	ΟΤ
WATERSHED/SUBSH	ED: Missle	Tonk Run	DATE: <u>6</u> /	5104 Assi	ESSED BY: 🎵	766220
SURVEY REACH ID:	_	ME: 9 : 5 AM/PM	Рното ID: (	(Camera-Pic #) Z		
SITE ID (Condition-#):	OT-09 L	AT 41 . 49 . 267				<b>PS:</b> (Unit ID)
· · · · · · · · · · · · · · · · · · ·					<u> </u>	
BANK: LT RT Head FLOW: None Trickle	TYPE:	MATERIAL: Concrete M PVC/Plastic B Other:	1etal 🛛 Circular		ISIONS: er: <u>2    (in)</u>	SUBMERGED: No Partially Fully
Moderate Substantial Other:	Open channel	Concrete Earn	then Trapezoid Parabolic Other:	Depth: Width (Top): " (Bottom):		NOT APOLICABLE
CONDITION: None Chip/Cracked	None     Gas     None       Chip/Cracked     Sewage     Oily       Peeling Paint     Rancid/Sour     Flow Line		VEGGIE DEM	Brow Other	:	Green
Corrosion     Sulfide     Paint       Other:     Other:     Other:		Excessive     Other:	Good Good Suds	POOL QUALITY:       No pool         Good       Odors       Colors       Oils         Suds       Algae       Floatables         Other:       Other:       Other:		
FOR       COLOR:       Clear       Brown       Grey       Yellow       Green       Orange       Red       Other:         FLOWING       TURBIDITY:       None       Slight Cloudiness       Cloudy       Opaque         ONLY       FLOATABLES:       None       Sewage (toilet paper, etc.)       Petroleum (oil sheen)       Other:         OTHER       Excess Trash (paper/plastic bags)       Dumping (bulk)       Excessive Sedimentation         ONCERNS:       Needs Regular Maintenance       Bank Erosion       Other:						
POTENTIAL RESTORATION CANDIDATE       Discharge investigation       Stream daylighting       Local stream repair/outfall stabilization         No       Storm water retrofit       Other:						
<i>If yes for daylighting:</i> Length of vegetative co		ft Type of	fexisting vegetation:_		Slope:	0
If yes for stormwater: Is stormwater currently Yes No No	controlled?	Land Us Area ava	se description: ailable:			
SEVERITY: cc (circle #) st	eavy discharge with a dis ong smell. The amount of mpared to the amount of eam; discharge appears inificant impact downstre	of discharge is significant d normal flow in receiving d to be having a am.	lischarge has a color and/o lischarge is very small com low and any impact appear	pared to the stream's base	discharge; stair of causing any	t have dry weather ning; or appearance erosion problems.
Support	5	4	3		2	1
SKETCH/NOTES:				D		
,				INEFORTED I	O AUTHORITIE	S: YES NO

				S	Severe B	lank Eros	ion	ER
WATERSHED/SUB	shed: Middle -	Tamla		DATE: 0/ 4	108	ASSESSE	DBY:	Princels
SURVEY REACH:			OC AM/PM	PHOTO ID (CAN			/#	I THENOLE
SITE ID: (Condition			" LONG <u>72 ° d</u>	7 1 54/911			<b>GPS:</b> (U)	
ER- <u>01</u>	END LAT					`	<b>JE 3:</b> (0)	nit ID)
Downcutting Widening Headcutting	Currently unknown Bed scour Bank failure Bank scour	LOCATION: DIMENSIONS	IDGUIT20 A	Straight section	Steep	slope/valley	1.1.1	<u>^</u>
Aggrading	Slope failure	Bank Ht		and/or RT	<u>&gt;ft</u>	Top wid	lth	ft
Sed. deposition	Channelized	Bank Angle	LT	and/or RT	°	Wetted	Width _	ft
LAND OWNERSHI	P: Private Public	c 🔲 Unknown	LAND COVER:	Forest I	Field/Ag	Develop	ed:	
POTENTIAL REST	ORATION CANDIDATE	C: Grade		Bank stabilizatio	n			
THREAT TO PROP	ERTY/INFRASTRUCT	URE: $\Box$ No	Yes (Describ	е).				
EXISTING RIPARIA			□ 25 - 50 ft □	,	1000			
					-100ft	□>100ft		
EROSION SEVERITY(circle#)	Active downcutting; tall ban of the stream eroding at a fa contributing significant amo stream; obvious threat to pr	ast rate; erosion unt of sediment to	Pat downcutting evide widening, banks active moderate rate; no thre	ly eroding at a	failure/ero	d width stable; i osion; likely cau	sed by a pi	eas of bank ipe outfall, local or adjacent use.
Channelized= 1	infrastructure.		infrastructure				regetation	
ACCESS:	5 Good access: Open area in ownership, sufficient room t materials, easy stream char heavy equipment using exis trails.	n public o stockpile nnel access for	4 (3) Fair access: Forested adjacent to stream. Ac removal or impact to la Stockpile areas small 3	cess requires tree andscaped areas.	other sens	sitive areas to a areas available rom stream sec	and/or loca	ated a great
NOTES/CROSS SEC					<i>Lu</i>	<u>_</u>		
)					D	D TO AUTHO		

Stream Crossing SC

	11.11	1		1				L		
WATERSHED		ank		DA		108		SSED BY:	Viluds	
URVEY REA		TIME::	_AM/PM		ото ID: (Cam			/#		
SITE ID: (Con	$\frac{dition{#}}{5/r}$	41 · 49 · 28	<u>'/</u> " Long /	00	<u>97 :54.3 "</u>	LN	MK	GPS (U	nit ID)	
TYPE: 🗌 Roa			Dam 🗌 Beav	/er Da	um 🔲 Geologi	cal Form	nation M	Other:		
For Road/ Railroad	SHAPE:         Arch       Bottomless         M Box       Elliptical         Circular       Other:	# BARRELS: Single Double Triple Other:	MATERIAL: Concrete Metal Other:		ALIGNMENT: Flow-aligner Not flow-al Do not kno	ed igned	DIMENS Barrel dia	IONS: (if varia meter: Height:	(ft)	
CROSSINGS ONLY	Cracking/chipping/corrosion Downstream scour hole Sediment deposition Failing embankment Other ( <i>describe</i> ):				CULVERT SL Flat Slight (2° – Obvious (>	5 ⁰ )		-	(ft)	
POTENTIAL RESTORATION CANDIDATE          Fish barrier removal         Culvert repair/replacement         Upstream storage retrofit         Local stream repair         Other:         Other:         Other:         Other:         Description:         Descri										
IS SC ACTING	G AS GRADE CONTROL	No Ye	es 🗌 Unk	nown	14" d	qov				
If yes for fish barrier	BLOCKAGE SEVERITY: (circle #) am or der or the significant reach of stream, or partial blockage that may h. t. the interfere with the migration of t. the the the the the the the the the the			a blockage at If a stream with fish habitat						
	Other:		5		4	3		2	1	
NOTES/SKET	СН:							· ·		
						Report	TED TO AUT	THORITIES 🗌	YES NO	

WATERSHEDSUBSIED:       Mitback       Intel:       1:2:1/2:4       Assessed in::       Style, 4:4         URAYER REACT ID:       Mitback       Intel:       1:2:2:5       Intel:       Style, 4:4         STELID:       Constance:       Style, 4:4       Mitback       Proor ID::       Constance:       Intel:       Style, 4:4         TYPE:       Constance:       Style, 1:4       Mitback       M						Stre	am Cros	ssing	SC	1
URVER REACH ID: FMIL- CP       TIME: 1.:52.04/PM       Proto ID: (Comerce-Fice 5)       7.4         STEE ID: (Constituent-4)       SC: 0.2       LAT 4[ ° +14] · 52.04/P       LOK 2[ ° -24] · 51.9       LMK       GPS (Uni ID)         TYPE: A code Crossing       Ratheod Crossing       Manmade Dam       Beaver Dam       Geological Formation       Other:         Arch       BAPF:       Single       Concrete       JHYERAL:       DIMENSIONS: (framedo, skered)         Box       Concording Chippingtoronsin       Dowlob       Concorted       Differ:       Other:         Construct       Construct       Construct       Construct       Construct       Construct       Construct       Construct         Construct       Construct       Construct       Downstream scoar hole       Sigle (2° - 5°)       Construct       Colvert length:       (f)         Construct       Construct       Construct       Colvert repaint/eplacement       Unknown       Construct       Construct       Construct       (f)         Construct       Co	WATERSHED	SUBSHED: Missle to	NL, River		ATE: 6	15108	ASSE	SSED BY:	75.7K.	LA TOP
TYPE:       Road Crossing       Bailroad Crossing       Mammade Dam       Geulogical Formation       Other:         FOR ROAD       Bettomics       # BARRELS:       MATERIAL:       ALGOMENT:       DIMENSIONS: (frontable, skect)         FOR ROAD       Concerter       # Double       Other:       Do to flow:       Dimensions: (frontable, skect)         CROSSING       Concerter       # Double       Other:       Do not know       Barrel diameter:       (fr)         CROSSING       Concerter       # Double       Do not know       Childer:       (fr)         CROSSING       Concerter       # Softmer Geoscience       Filat       Childer:       (fr)         CROSSING       Concerter       # Softmer Geoscience       (fr)       Width:       (fr)         Crockage Status       Downstream scour hole       Eish barrier removal       Culvert repuir/replacement       Ulvert length:       (fr)         Roadway elevation:       I construct repuir/replacement       Upstream storage retrofit       (fr)         Astrophysical Biologic Biology       I construct repuir/replacement       Upstream storage retrofit       (fr)         SC ACTING AS GRADE CONTROIL       Not       Note:       Status       Astrophysical Biologic Biology       (fr)         If sharrier									20/01/0	
SIAPE:       #BARELS:       MATCHAL:       ALIGNMENT:       DIMENSIONS: (f) variable, sknetch)         FOR ROAD       Circular       Doable       Concerted       Donor know         CONSTINCT       Conclusing/dispiration       Doomstream sour hole       Curvert sLope:       Calvert length:       (f)         Construction       Other:       Construction       Downstream sour hole       Curvert sLope:       Calvert length:       (f)         Construction:       Other (describe):       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         Coo       Is SC ACTING AS CRADE CONTROL       No       Yee       Unknown         If yes for       Teal       Particle and repair       Other:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachage at the vary head of a steam with a stard or pair or physic AL BUOCKAGE:       A steachage at the vary head of a steam with a stard or pair or pair or physic AL BuocKAGE:       A steam or pair or physic AL BuocKAGE:       A steachage at the vary he	SITE ID: (Con	ndition-#) SC- <u>07</u> LAT	41 . 49 .26	<u> 기</u> " Long <u>92</u>	· 27.	<u>54.3</u> " L	мк	GPS	(Unit ID)	
SIAPE:       #BARELS:       MATCHAL:       ALIGNMENT:       DIMENSIONS: (f) variable, sknetch)         FOR ROAD       Circular       Doable       Concerted       Donor know         CONSTINCT       Conclusing/dispiration       Doomstream sour hole       Curvert sLope:       Calvert length:       (f)         Construction       Other:       Construction       Downstream sour hole       Curvert sLope:       Calvert length:       (f)         Construction:       Other (describe):       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         Coo       Is SC ACTING AS CRADE CONTROL       No       Yee       Unknown         If yes for       Teal       Particle and repair       Other:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachas a dam or pair or physic AL BUOCKAGE:       A steachage at the vary head of a steam with a stard or pair or physic AL BUOCKAGE:       A steachage at the vary head of a steam with a stard or pair or pair or physic AL BuocKAGE:       A steam or pair or physic AL BuocKAGE:       A steachage at the vary he										
Arth       Botomeric       Single       Concrete       Flow-aligned       Barrel diameter:       (f)         Barrel diameter:       Billiptical       Concrete       Flow-aligned       Barrel diameter:       (f)         Constructor       Control (constructor)       Control (constructor)       Control (constructor)       Control (constructor)       Control (constructor)       Constructor)       Constructor       (f)         Constructor       Constructor)       Constructor       Constructor)       Constructor       (f)         Constructor       Constructor)       Constructor       Constructor       (f)         Constructor       Constructor)       Constructor       (f)         Constructor       Constructor)       Constructor       (f)         Constructor       Constructor       (f)       Rodowy elevation:       (f)         Constructor       Constructor       No       Ys       Unknown       Upsteam storage retrofit         Constructor       Constructor       No       Ys       Unknown       Indefer storage stora	TYPE: X Roa						1			
ONLY       Conclusion (c) number 0 = 0         Settiment deposition       Bailing embankment       Stight (2' - 5')         Other (describe):       Bubrious (>5')       Roadway elevation:       (f)         PODENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culver repair/replacement       Upstream storage retrofit         Boo       Cool of the describe):       Bubrious (>5')       Roadway elevation:       (f)         PODENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culver repair/replacement       Upstream storage retrofit         Boo       Extent of Phrysical Blockace:       BLOCKACE SEVENTY: (c)rcle #)       Attempory harrier such as a dim or y or douber on a douber or grades referant blockage fits may interfere with the migation of a stream, with the such as a dim or y interfere with the migation of a stream storage retrofit hor y with water Depht:       (in)         Bor of the weak as dim or y interfere with the migation of a stream storage retrofit hor y withe double hor a stream storage retrofit hor y withe double hor a stream storage retrofit hor y with water Depht:       (in)         Bor of the weak as dim or y interfere with the migation of a stream storage retrofit hor y with water douber on a storage retrofit hor y with water douber on a storage retrofit hor y with water douber on a storage retrofit hor y with water douber on a storage retrofit hor y with water douber on a storage retrofit hor y with water douber on a storage retrofit hor y with water douber on a storage retrofit hor y with water douber on a storage retrofit hor y with water douber on a	RAILROAD	PR ROAD/       Arch       Bottomless       Single         OR ROAD/       Circular       Double         Office       Other:       Other:			Flo	w-aligned t flow-aligned	Barrel dia	meter: Height:	ariable, sketo	_(ft)
Pro		Cracking/chipping/corrosion			Fla	t ght (2° – 5 ⁰ )		Width:	10 3	_(ft)
EXTENT OF PHYSICAL BLOCKAGE:       BLOCKAGE SEVERITY: ( <i>circle #</i> )         Total       Partial         Tomporary       Unknown         If yes for       CAUSE:         Drop too high       Water Drop:         Plow too shallow       Water Depth;         Other:       5       4       3         NOTES/SKETCH:       5       4       3       2		RESTORATION CANDIDATE			t repair/rep	placement 🔲 🛛	Upstream si	torage retro	ofit	
Image: space of the space	IS SC ACTIN	G AS GRADE CONTROL		es 🗌 Unkno	wn					
A structure such as a damor <i>fish barrier</i> CAUSE: CAUSE: Drop too high Water Drop:(in) Content of a stream movement of a stream with constrained of the stream of the stream of the stream with the migration of anadromous fish, no fish passage device present NOTES/SKETCH: A structure such as a damor or partial blockage that may herefore with the migration of anadromous fish. 3 3 2 1 NOTES/SKETCH:			CKAGE:	r	BLO	CKAGE SEVEI	RITY: (circ	le #)		
S 4 3 2 1	If yes for         fish barrier         CAUSE:         Drop too high         Water Drop:         Flow too shallow         Water Depth:         (in)		road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish		tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of		beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such		eat hwith tat	
	Januar			5	4	4 3		2	1	
Reported to Authorities TYES NO	NOTES/SKET	ΥCΗ:								
						REPOR	TED TO AU	THORITIES	VES I	]No

Stream	Cross	sinc

Stream Crossing	SC
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WATEDCHED	SUBSHED: Missie To	nk Rue		Dim	. /	15108	1.000		K Yr (AD
	CHID: MT2-09	TIME: 10 : 17		DATE		<u></u> 6 : (Camera-Pic		$\frac{\text{SSED BY:}}{5}$ /#	15, 34, 6A, 70
And the contract of the	an na ana ang kan na akang kalini an ang kan na si 🖡 👘 👘	41 º 49:26				· · · · · · · · · · · · · · · · · · ·	<u>т)</u> ИК		(Unit ID)
		<u></u>							(0/// 12)
TYPE: 🗌 Roa	ad Crossing 🕅 Railroad Crossi	ng 🗌 Manmade	Dam 🔲 Beave	er Dam		Geological Form	nation 🔲	Other: 7	Pails to Trail
	SHAPE:	<b># BARRELS:</b>	MATERIAL:			IMENT:	DIMENS	IONS: (if v	ariable, sketch)
	Arch Bottomless Box Elliptical	Single	Concrete	1		w-aligned	Barrel dia		(ft)
FOR ROAD/	Circular	Triple	Metal			flow-aligned not know		Height:	5 st (ft)
RAILROAD	Other:	Other:	Stone Black	<u>5</u>				.1	Sft
CROSSINGS Only	<b>CONDITION:</b> (Evidence of)				ULVI	ERT SLOPE:	Culvert le		(ft) <u>3(+(ft)</u>
	Cracking/chipping/corrosion					ht $(2^{\circ} - 5^{\circ})$		wiuni.	<u>364</u> (ft) 354
	Other (describe): B10015	Failing emb	bankment		-	vious (>5°)	Roadway	elevation:	
		TNDIE		I					
ि र	RESTORATION CANDIDATE	Fish barrier re		-	ir/rep	lacement 🔲 U	Jpstream st	orage retro	ofit
no no			repair 🗌 Othe	er:					
IS SC ACTING	G AS GRADE CONTROL	$\nabla N_0 \Box Y$	es 🗌 Unk	nown					
	EXTENT OF PHYSICAL BLC	CKAGE:	<u> </u>	]	BLOG	CKAGE SEVER	ITY: (circ	le #)	
	Total Partial Temporary Unknow	wn	A structure such a			A total fish blocka			ry barrier such as a
If yes for			road culvert on a greater stream blo			tributary that woul significant reach c			n or a blockage at ad of a stream with
fish barrier	CAUSE:	rop: (in)	upstream movem anadromous fish;			or partial blockage interfere with the r			
	Flow too shallow Water D		passage device p			anadromous fish.	ingration of	as waterfal	
)	Other:		5		4	3		2	1
NOTES/SKET	CH:								
			/						
	Epils T	O TIPIL	> Culus	77					
	· · KD.() r	1.							
			,						
	- 10045	DANGNO	5						
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		* Statements and the	1						
			BIOTES						
	/		Krun Krun	1982 L	4				
		a construction of the second s							
		والمرتبع	And a second			a de la companya de l La companya de la comp			
		A comparison of the second		7					
A	· · · · · · · · · · · · · · · · · · ·					REPORT	FED TO AUT	THORITIES	
									4

Stream Crossing

WATEDSHED	SUBSHED: MODLE TA	M		Date: 6	15108	A cor		4101170
	CH ID: MTR-09	TIME: 11 : 12			: (Camera-Pi		ESSED BY:	VIL, DA, JE +1Z
		41.049.22				<u>мк</u>		$\frac{\varphi}{S}$ (Unit ID)
		<u> </u>					-   011	- (0
TYPE: Roz	ad Crossing 🔲 Railroad Crossi	ng 🔲 Manmade I	Dam 🗌 Beave	r Dam 🔲	Geological For	mation	] Other:	
For Road/ Railroad	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS:	MATERIAL: Concrete Metal Other:	D Flc	NMENT: w-aligned t flow-aligned not know	Barrel dia	ameter: Height:	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	ing/chipping/corrosion Downstream nent deposition Failing emb		Fla	ERT SLOPE: t ght (2° – 5 ⁰ ) vious (>5°)	Culvert le Roadway	ength: Width: elevation	<u>3()</u> (f (f : <u>3(</u>
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re			placement 🔲 🛛	Upstream s	torage retr	ofit
IS SC ACTING	G AS GRADE CONTROL		es 🗌 Unkr					
	EXTENT OF PHYSICAL BLC	OCKAGE:		BLO	CKAGE SEVEI	RITY: (circ	le #)	
If yes for fish barrier	Flow too shallow Water D	rop: (in) epth: (in)	A structure such a road culvert on a 3 greater stream blo upstream moveme anadromous fish; passage device pr	Brd order or ocking the ent of no fish	order or tributary that wou ng the significant reach of or partial blockag ish interfere with the		build isolate a h of stream, age that may le migration of	
NOTES/SKET	A Other: Dub is block	Xe or	5	4	4 3		(2)	1

WATERSHED/SUB	shed: Middle Thi	nh	DATE:	1.08	Assessed BY: Friends
JURVEY REACH I	D: MTRON TI	ме: <u>5:30</u> ам/М	Рното ID: (Ca	mera-Pic #)	1# 49
SITE ID: (Condition	#) TR- <u>01</u> LAT <u>41</u> .	49 .34,5 " LONG	372 · 27 · 55	<u>9</u> " LMK	GPS: (Unit ID)
TYPE: Industrial Commercial Kesidential	MATERIAL:         Plastic       Paper         Tires       Constr         Appliances       Yard V         Automotive       Other:	—	SOURCE: Unknown Flooding Ullegal dump Local outfall	LOCATION:	$\begin{array}{c} \textbf{LAND OWNERSHIP:} \\ \square Public & \square Unknown \\ \blacksquare Private \\ \hline \textbf{AMOUNT (\# Pickup truck loads): } // 0 \end{array}$
POTENTIAL REST	ORATION CANDIDATE $\square$	tream cleanup 🔲 Strea Dther:	m adoption segment	Removal/pre	evention of dumping
If yes for trash or debris removal		Heavy equipment 🗹 Tr			DUMPSTER WITHIN 100 FT:
CLEAN-UP POTENTIAL: (Circle #)	A small amount of trash (i.e., less than two pickup truck loads) located inside a park with easy access	A large amount of trash, o with easy access. Trash m a long period of time but few days, possibly with a si	nay have been dumped o it could be cleaned up ir	ver A large amount area, where acc	t of trash or debris scattered over a large cess is very difficult. Or presence of drums f hazardous materials
NOTES:	5	4	3	2	1
)				REPORTED	TO AUTHORITIES 🗌 YES 🗌 NO

WATERSHED/SUI	sshed: Middy T	õin h	DATE: 614	108	ASSESSED BY: FELEDJ
SURVEY REACH	D: MTR 09 TI	ME: <u>5 : 32 am/</u> PM	Рното ID: (Са	mera-Pic #)	/# 5]
SITE ID: (Condition	т#) <b>TR-<u>02</u>   Lat<u>4)</u> °_</b>	49 134.3 " LON	<u>G72027.56</u>	<u>.  </u> " LMK	<b>GPS:</b> (Unit ID)
TYPE: ☐ Industrial ☐ Commercial ☑ Residential	MATERIAL:    Plastic    Tires    Construction    Appliances    Vard W    Automotive	—	SOURCE: Unknown Flooding Illegal dump Local outfall	LOCATION: Stream Riparian Are Lt bank Rt bank	ea LAND OWNERSHIP: Public Unknown Private AMOUNT (# Pickup truck loads):
POTENTIAL REST	CORATION CANDIDATE	tream cleanup 🔲 Strea	am adoption segment	Removal/pre	evention of dumping
If yes for trash or debris removal		Heavy equipment 🔲 T			<b>DUMPSTER WITHIN 100 FT:</b>
CLEAN-UP POTENTIAL: ( <i>Circle</i> #)	A small amount of trash (i.e., less than two pickup truck loads) located inside a park with easy access	A large amount of trash, of with easy access. Trash r a long period of time but few days, possibly with a s	nay have been dumped of it could be cleaned up ir	ver A large amoun area, where ac	t of trash or debris scattered over a large cess is very difficult. Or presence of drums f hazardous materials
NOTES:	(5)	4	3	2	1
TOTES.					
)				REPORTED	TO AUTHORITIES YES NO

WATERSHED/SUB	SHED: MITHE T	Any KNUS	2	DATE: <u>6/</u> 2	10-6	ASSESSED BY: TRIENDS
JURVEY REACH I	D: MTR-09	TIME: 10 : 13	AM/PM	PHOTO ID: (Ca	mera-Pic #) 5	/#
SITE ID: (Condition-	#) TR- <u>03</u> LAT <u>4</u>	1.49.267	"LONG	12.0 27 . 521	''' LMK	GPS: (Unit ID)
TYPE: Industrial Commercial Residential	= 7	nstruction I Me rd Waste	etal [ edical [	SOURCE: Unknown Flooding Illegal dump Local outfall	LOCATION:	ea LAND OWNERSHIP: Public Unknown Private AMOUNT (# Pickup truck loads): / 07
POTÉNTIAL REST	ORATION CANDIDATE [	Stream cleanup   Other:	Stream	n adoption segment	Removal/pro	evention of dumping
If yes for trash or debris removal	EQUIPMENT NEEDED : Who can do it:	Heavy equipmer	nt 🔲 Tra Local Go			DUMPSTER WITHIN 100 FT:
CLEAN-UP POTENTIAL: (Circle #)	A small amount of trash (i.e., I than two pickup truck loads) loca inside a park with easy access	ted with easy access	. Trash ma time but it		A large amoun area, where ac or indications o	t of trash or debris scattered over a large cess is very difficult. Or presence of drums f hazardous materials
NOTES:	5	4	<u></u>	3	2	1
						D TO AUTHORITIES TYPES TO NO

WATERSHED/SUB	shed: Misole	Tonk-	River	DATE: <u>6</u> / 6	5108	ASSESSED BY: JS P. GA JK			
JURVEY REACH I	D: MTR-09	Тіме	. <u>/0: 55</u> ам/рм	Рното ID: (Ca	mera-Pic #) 🎸	9 /#			
SITE ID: (Condition	-#) TR- <u>04</u> L	ат <u>41° 4</u>	9.'24.5." LON	G <u>72 ° 27 ' 48</u>	<u> 3</u> " lmk_	<b>GPS:</b> (Unit ID)			
TYPE: Industrial Commercial Residential	Tires Appliances	<ul> <li>Paper</li> <li>Construction</li> <li>Yard Wast</li> <li>Other:</li> </ul>		SOURCE: Unknown Flooding Illegal dump Local outfall	LOCATION: Stream Riparian Ard Lt bank Rt bank				
POTENTIAL RESTORATION CANDIDATE Stream cleanup Stream adoption segment Removal/prevention of dumping									
If yes for trash or debris removal	EQUIPMENT NEEDE WHO CAN DO IT:	D: A Hear		`rash bags □ Unkno Gov □ Hazmat Te		DUMPSTER WITHIN 100 FT:			
CLEAN-UP POTENTIAL: (Circle #)	A small amount of trasl than two pickup truck loa inside a park with easy a	ads) located a	th easy access. Trash i	or bulk items, in a small a may have been dumped o it could be cleaned up ir small backhoe.	A large amour area, where ac or indications c	t of trash or debris scattered over a large ccess is very difficult. Or presence of drums of hazardous materials			
NOTES:	5 	5 OF T TIRE	(1) >EBEIS / >, STUMP	3 Lerarces/L S	2	1			
·					Reportei				

## Storm Water Outfalls

WATERSHED/SUBSHI	ED:				DATE: / /	ASSESSED BY:	
SURVEY REACH ID:		Тім	IE:AM/P	М	<b>Рното ID:</b> (Camera-Pic ;	<i>#)</i> /#	
<b>SITE ID</b> (Condition-#):	OT	LAT	<u> </u>	_"Lo	DNG''	LMK	GPS: (Unit ID)
BANK:           LT         RT         Head           FLOW:         Trickle	TYPE:		MATERIAL: Concrete PVC/Plastic Other:	]Metal ]Brick	SHAPE:     Single       Circular     Double       Elliptical     Triple       Other:     State	<b>DIMENSIONS:</b> Diameter: <u>(in</u>	SUBMERGED: No D Partially Fully
<ul> <li>Moderate</li> <li>Substantial</li> <li>Other:</li> </ul>	Open channel		Concrete E	Earthen		oth: <u>(in)</u> lth (Top): <u>(in)</u> (Bottom): <u>(in)</u>	
CONDITION:ODOR:NNoneGasChip/CrackedSewagePeeling PaintRancid/SoCorrosionSulfideOther:Other:		our	DEPOSITS/STAIN OIL	IS:	<ul> <li>None</li> <li>Normal</li> <li>Inhibited</li> <li>Excessive</li> <li>Other:</li> </ul>	PIPE BENTHIC GH Brown Ora Other: POOL QUALITY: Good Odors Suds Algae Other:	nge Green
FOR COLO	R:	Clear	Brown	Grey	☐ Yellow ☐ Green ☐ G	Drange 🗌 Red 🔲	Other:
FLOWING TURB		None	Slight Cloudin		Cloudy Opaque		
		None					Other:
0.11121	cess Trash (pap eds Regular Ma	-	-	Dumping Bank Erc		edimentation	
	~					1	
POTENTIAL RESTOR	ATION CANDI	DATE	☐ Discharge inv ☐ Storm water re	-	n  Stream daylighting Other:	Local stream repai	r/outfall stabilization
If yes for daylighting							
•••••		1:	ft Type	e of exist	ting vegetation:	Slope	:°
If yes for stormwater. Is stormwater currently	controlled?			l Use des availabl	scription: le:		_
SEVERITY: S (circle #) S		ount of o ount of no pears to	discharge is significant ormal flow in receiving be having a	dischar dischar	lischarge; flow mostly clear and odo ge has a color and/or odor, the amo ge is very small compared to the str d any impact appears to be minor / I	unt of eam's base	bes not have dry weather e; staining; or appearance g any erosion problems.
		5		4	3	2	1
Sketch/Notes:					Ri	EPORTED TO AUTHOI	RITIES: 🗌 YES 🗌 NO

Severe Bank Erosion

ER

SURVEY REACH:       TIME:AMPM       FINOTO ID (CAMERA-PRC #): // #         STE ID: Condition=#       START LAT       '' LONG       '' LONG       '' LMK       GPS: (lour ID)         Re       Evp1       Evp1       LAT       '' LONG       ''' LONG       ''' LMK       GPS: (lour ID)         PROCESS:       Currently unknown       BACK OF CONCERN:       LT       RT       BACK OF R       Concerns (lour Back addition)       Beep stope valley wall   Other:         Downcutting       Bank failure       BANK OF CONCERN:       LT       R and or RT       ft       Doyn width       ft         Aggrating       Stope failure       Bank Aggle       LT       and/or RT       ft       Doyn width       ft         Ando OWNERSUP:       Private       Public       LINknown       LAND COVER:       Forst       Field/Ag       Developed:         CTTNLIA RESTORATION CANDIDATE:       Grade control       Bank stabilization       Other:       Stand of Stand	WATERSHED/SUBS	HED:			DATE: /	/	Asses	SED BY:		
ER	SURVEY REACH:		TIME: :	AM/PM	Рното ID (Сам	ERA-PIC #	[‡] ):	/#		
ER	SITE ID: (Condition-#	( [#] ) START LAT	0 1 1	"LONG°_	' ''	LMK		GPS: (Unit ID)		
PROCESS:       Currently unknown       BANK OF CONCERN:       LT       RT       Both (looking downstream)         Downcutting       Bank failure       Meander bend       Straight section       Steep slope/valley wall       Other:         Dimensions:       LocATION:       Meander bend       Straight section       Steep slope/valley wall       Other:         Meadeuting       Bank failure       Bank failure       Immensions:       Length (if no GPS)       LTft and/or RTft       Bottom widthft         Aggrading       Slope failure       Bank Angle       LTo and/or RTo       Wetted Widthft         LAND OWNERSHIP:       Private       Public       Unknown       LAND COVER:       Forest       Field/Ag       Developed:         POTENTIAL RESTORATION CANDIDATE:       Grade control       Bank stabilization       No       Other:         THREAT TO PROPERTY/INFRASTRUCTURE:       No       Yes (Describe):       Existing Riparian width stable: isolated areas of bank failure/erosion; likely caused by a pipe outfail, local scorr, impared riparian vegetation or adjacent to stockpic or infrastructure.       Pat downcutting evident, active stream widening, banks sactively eroding at a distart rate; erosion continuum significant amount of sockpic more stream. Access requires tream workers to property or infrastructure.       Grade and width stable: isolated areas of bank indiversing a pipe outfail, local scorr, impared riparian vegetation or adj	ER	END LAT	0 1 1	LONG °		LMK				
□ Downcutting       □ Bed scour       LOCATION: □ Meander bend □ Straight section □ Steep slope/valley wall □ Other:         □ Miensions:       □ Bank failure       □ Bank scour       □ Dimensions:         □ Aggrading       □ Slope failure       Bank Ht       LT ft and/or RT ft       Bottom width ft         □ Aggrading       □ Slope failure       Bank Angle       LT o and/or RT o'       Wetted Width ft         □ And OWNERSHIP:       □ Private       □ Public       Unknown       LAND COVER:       □ Forest       □ Field/Ag       □ Developed:										
□ Downcutting       □ Diversions:         □ Widening       □ Bank failure       □ Length (if no GPS) LTft and/or RTft       Bottom widthft         □ Aggrading       □ Slope failure       Bank Ht       LTo and/or RTo'       Wetted Widthft         □ And OwnERSHIP:       □ Private       □ Public       □ Unknown       LAND COVER:       □ Forest       □ Field/Ag       □ Developed:         POTENTIAL RESTORATION CANDIDATE:       □ Grade control       □ Bank stabilization       □ Other:       □ Other:         THREAT TO PROPERTY/INFRASTRUCTURE:       No       □ Yes (Describe):       Existing Riparian       >100ft         EROSION       Active downcutting: tal banks on both sides of the stream eroding at a fast rate; erosion cirtifulut significant amound to sediment to stream; obvious threat to property or infrastructure.       Pat downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure.       Grade and width stable: isolated areas of bank failure/erosion: likely caused by a pipe outfail, local scour, impaired riparian vegetation or adjacent use.         Channelized=       1       5       4       3       2       1         Acccess:       Good access: Open area in public owership, sufficient mound to scokepile materials, easy stream channel access for heavy equipment using existing roads or talls.       Fair access: Forested or developed areas andiable and/or located a great distance from stream se	PROCESS:	Currently unknown				0	,			
□       Mideling       □       Baik failure       Length (if no GPS)       LTft and/or RTft       Bottom widthft         □       Aggrading       □       Slope failure       Bank Ht       LTo and/or RTo'       Wetted Widthft         □       Aggrading       □       Channelized       Bank Angle       LTo and/or RTo'       Wetted Widthft         □       Association       □       Channelized       Unknown       LAND COVER:       □       Forest       □       Beild/Ag       □       Developed:	Downcutting	—			Straight section	∐ Steep s	lope/vall	ey wall 🗋 Other:		
□ Adggrading       □ Dains scolar       Bank Ht       LTft       and/or RTft       Top widthft         □ Aggrading       □ Channelized       Bank Angle       LTo and/or RTo       Wetted Widthft         □ And OWNERSHIP:       Private       Public       Unknown       LAND COVER:       Forest       □ Field/Ag       □ Developed:         □ And Source       □ Other:       □ Other:       □ Other:       □ Other:       □ Other:         □ THREAT TO PROPERTY/INFRASTRUCTURE:       No       □ Yes (Describe):       □ Store Stram eroding at a fast rate: erosion contribuing significant amount of sediment to property or infrastructure.       Pat downcutting evident, active stream widening, banks actively eroding at a moderate rate: no threat to property or infrastructure.       Grade and width stable: isolated areas of bank failure/erosion: likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.         Channelized =	Widening	Bank failure				a	_			
□ Agg adding       □ Stope Hardre       Bank Angle       LTo and/or RTo       Wetted Widthft         □ And OWNERSHIP:       □ Private       □ Public       Unknown       LAND COVER:       □ Forest       □ Field/Ag       □ Developed:         POTENTIAL RESTORATION CANDIDATE:       □ Grade control       □ Bank stabilization       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       □       <	Headcutting									
LAND OWNERSHIP:       Private       Public       Unknown       LAND COVER:       Forest       Field/Ag       Developed:         POTENTIAL RESTORATION CANDIDATE:         No       Other:         THREAT TO PROPERTY/INFRASTRUCTURE:       No       Yes (Describe):         EXISTING RIPARIAN WIDTH:       \$\leq25\$ ft       25 - 50 ft       50-75 ft       75-100 ft       >100 ft         EROSION       Severity(circle#)       Active downcuting: tall banks on both sides of the stream eroding at a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.       Pat downcutting evident, active stream widening, banks actively eroding at a fast rate; oro threat to property or infrastructure.       Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.         Accesss:       Good access: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Fair access: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas available and/or located a great distance from stream. Stockpile areas available and/or located a great distance from stream. Stockpile areas available and/or located a great distance from stream section. Specialized heavy equipment required.         5       4       3       2       1 <td>Aggrading</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td>	Aggrading						-			
POTENTIAL RESTORATION CANDIDATE:       Grade control       Bank stabilization         No       Other:       Other:         THREAT TO PROPERTY/INFRASTRUCTURE:       No       Yes (Describe):         EXISTING RIPARIAN WIDTH:       \$\geq25\$ ft       25 - 50 ft       50 - 75 ft       75 - 100 ft       >100 ft         EROSION SEVERITY(circle#)       Active downcutting: tall banks on both sides of the stream eroding at a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.       Pat downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure.       Grade and width stable: isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.         ACCESS:       Good access: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Fair access: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.       Difficult access. Must cross wetland, steep slope or other sensitive areas to access stream. Minimal stockpile areas available and/or located a great distance from stream section. Specialized heavy equipment required.		_					Wette	d Widthft		
No       Other:         THREAT TO PROPERTY/INFRASTRUCTURE:       No       Yes (Describe):         EXISTING RIPARIAN WIDTH:       \$\lefter 25 \cdot 50 \cdot 61 \lefter 50 \cdot 75 \c	LAND OWNERSHIP:       Private       Public       Unknown       LAND COVER:       Forest       Field/Ag       Developed:									
EXISTING RIPARIAN WIDTH:       \$\leq 25 ft\$       \$\leq 25 - 50 ft\$       \$\leq 50 - 75 ft\$       \$\leq 75 - 100 ft\$       \$\req 100 ft\$         EROSION SEVERITY(circle#)       Active downcutting; tall banks on both sides of the stream eroding at a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.       Pat downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure.       Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.         Channelized=       1       5       4       3       2       1         ACCESS:       Good access: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Fair access: Forested or developed areas. Stockpile areas small or distant from stream.       Difficult access. Must cross wetland, steep slope or other sensitive areas to access stream. Minimal stockpile areas available and/or located a great distance from stream section. Specialized heavy equipment required.         5       4       3       2       1										
EROSION SEVERITY(circle#)Active downcutting: tall banks on both sides of the stream eroding at a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.Pat downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure.Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.Channelized=154321Accesss:Good access: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.Fair access: Forested or developed areas. stockpile areas small or distant from stream.Difficult access. Must cross wetland, steep slope or other sensitive areas to access stream. Minimal stockpile areas available and/or located a great distance from stream section. Specialized heavy equipment required.EROSION Channelized=54321	THREAT TO PROPE	erty/Infrastruct	URE: 🗌 No	Yes (Descrit	be):					
Sevenity       of the stream eroding at a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.       Pat downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure.       Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.         Channelized=       1       5       4       3       2       1         Access:       Good access: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Fair access: Forested or developed areas. Stockpile areas small or distant from stream.       Difficult access. Must cross wetland, steep slope or other sensitive areas to access stream. Minimal stockpile areas available and/or located a great distance from stream section. Specialized heavy equipment required.	EXISTING RIPARIAN WIDTH:         \$\leq 25 ft\$         \$25 - 50 ft\$         \$50-75 ft\$         \$75-100 ft\$         \$>100 ft\$									
SEVERITY (ctr/ct#/)       contributing significant amount of sediment to stream; obvious threat to property or infrastructure.       widening, banks actively erouing at a moderate rate; no threat to property or infrastructure.       failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.         Channelized=       1       5       4       3       2       1         ACCESS:       Good access: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Fair access: Forested or developed areas. Stockpile areas small or distant from stream.       Difficult access. Must cross wetland, steep slope or other sensitive areas to access stream. Minimal stockpile areas available and/or located a great distance from stream section. Specialized heavy equipment required.         5       4       3       2       1						Grade and	width stah	le isolated areas of bank		
Stream; ouvious fileat to property of infrastructure.       infrastructure       Scour, infpared ripatial vegetation of adjacent use.         Channelized=       1       5       4       3       2       1         ACCESS:       Good access: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Fair access: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.       Difficult access. Must cross wetland, steep slope or other sensitive areas to access stream. Minimal stockpile areas available and/or located a great distance from stream section. Specialized heavy equipment required.         5       4       3       2       1	<b>SEVERITY</b> (circle#)	contributing significant amo	ount of sediment to			failure/eros	sion; likely a	caused by a pipe outfall, local		
Access:       Good access: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Fair access: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream       Difficult access. Must cross wetland, steep slope or other sensitive areas to access stream. Minimal stockpile areas available and/or located a great distance from stream section. Specialized heavy equipment required.         5       4       3       2       1	Channelized - 1		roperty or		car to property of	scour, imp	aired riparia	an vegetation or adjacent use.		
ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Fall access: Polested 0f developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.       other sensitive areas to access stream. Minimal stockpile areas available and/or located a great distance from stream section. Specialized heavy equipment required.         5       4       3       2       1		5		4 3		=				
	ACCESS:	ownership, sufficient room materials, easy stream cha heavy equipment using exi trails.	to stockpile nnel access for sting roads or	adjacent to stream. A removal or impact to Stockpile areas small	removal or impact to landscaped areas. Stockpile areas small or distant from stream.			itive areas to access stream. Minimal reas available and/or located a great om stream section. Specialized heavy required.		
NOTES/CROSS SECTION SKETCH:	NorralCross	-	4	4 3		2		1		
	NOTES/CROSS SEC	TION SKETCH:								

						Impac	cted Bu	ıffer	IB
WATERSHED/SUBSHED:					DATE:	//	Ass	SESSED B	Y:
SURVEY REACH:			TIME:	: AM/PM		D ID: (Camera-l	Pic #)	/	#
<b>SITE ID:</b> (Condition-#)	START LA	т°			<u>'</u> '''''			GPS:	(Unit ID)
IB	END LA			ONG0		' LMK		_	
		<u> </u>	*						
IMPACTED BANK:     LT   RT     Both	<b>REASON INA</b>			vegetation		Widespread i	nvasive p	plants	
LAND USE:	Private I	nstitutional	Golf Cou	rse Park	Other Publ	ic			
(Facing downstream) LT Ban									
RT Ban									
DOMINANT	Paved		d Turf/lav	_	ss Shrub/s		Other		
LAND COVER: LT Bar						_			
RT Bar							<u> </u>		
INVASIVE PLANTS:	None None	Rare		artial coverage		tensive coverage	unk	known	
STREAM SHADE PROVID	ED? 🗌 None	e 🗌 Part	ial 🗌	Full Wi	ETLANDS PH	RESENT? 🗌 No	🗌 Y	es 🗌 U	Jnknown
POTENTIAL RESTORATION	ON CANDIDA	<b>FE</b> Activ	ve reforestati	on Greenw	ay design	Natural regener	ration	Invasive	es removal
no no		Othe	er:			1			
<b>Restorable Area</b>				Impacted area o	n public land	Impacted area on ei			area on private
LT BANK		<b>REFOREST</b> <b>POTENTIAL</b> ( <i>Circle</i> #)		where the riparia not appear to be specific purpose area available fo	used for any plenty of	public or private lan- presently used for a purpose; available a planting adequate	specific	encroach feature si	e road; building ment or other gnificantly limits area for planting
Width (ft):		(01/010/1/)		area available iu		4 3			
POTENTIAL CONFLICTS				despread invas	ive plants	Potential cont	aminatio	2 n 🗌 La	ack of sun
NOTES:									

# Stream Crossing

<i>If yes for</i> <i>fish barrier</i> CAUSE: road culvert on a 3rd order or <i>greater stream blocking the</i> <i>upstream movement of or partial blockage that may very little viable fish hab</i>	WATERSHED	/SUBSHED:		-		DA	TE:	<u> </u>	ASSE	SSED BY:
TYPE:       Road Crossing       Railroad Crossing       Manmade Dam       Beaver Dam       Geological Formation       Other:         TYPE:       Road Crossing       Railroad Crossing       Manmade Dam       Beaver Dam       Geological Formation       Other:         Arch       Bottomless       Single       Concrete       Flow-aligned       Barrel diameter:       Height:         Carcolar       Circular       Triple       Other:       Do not know       Culvert stope:       Culvert length:         ONLY       Other:       Other:       Do not know       Culvert stope:       Culvert length:       Width:         Crossings       Condition       Failing embankment       Slight (2° - 5°)       Obvious (>5°)       Roadway elevation:         Other (describe):       Dothet deposition       Failing embankment       Other:       Upstream storage retrofit         no       Local stream repair       Other:       Other:       Height:       Width:         SSC ACTING AS GRADE CONTROL       No       Yes       Unknown       A total fish blockage on a repairial       A total fish blockage on a repaire storage retrofit         If yes for fish barrier       Drop too high       Water Drop:       (in)       A structure such as a dam or gradule ton a 3dordor or greater stream blocking the upstream novement of ana	SURVEY REA	сн <b>ID:</b>		TIME::	AM/PM	Рн	ото ID	: (Camera-Pio	c #)	/#
For ROAD/ RAILROAD CROSSINGS ONLY       SHAPE:    Arch    Bottomless    Box    Elliptical    Circular       # BARRELS:    Single    Double    Triple       MATERIAL:    Concrete    Other:       ALIGNMENT:    Flow-aligned    Not flow-aligned    Do not know       DIMENSIONS: (if variable, ske Barrel diameter:	SITE ID: (Con	dition-#) SC	LAT	o'	_" LONG	<u> </u>	<u>'</u>	<u> </u>	МК <u></u>	GPS (Unit ID)
For ROAD/ RAILROAD CROSSINGS ONLY       SHAPE:    Arch    Bottomless    Box    Elliptical    Circular       # BARRELS:    Single    Double    Triple       MATERIAL:    Concrete    Other:       ALIGNMENT:    Flow-aligned    Not flow-aligned    Do not know       DIMENSIONS: (if variable, ske Barrel diameter:	m []-							~		~
For Road/ RAILROAD       Arch       Bottomless       Single       Concrete       Flow-aligned       Barrel diameter:       Height:         CrossIngs ONLY       Circular       Other:       Other:       Double       Metal       Do not know       Culvert slope:         Condition:       Evidence of)       Condition:       Evidence of)       Culvert slope:       Culvert length:       Width:         CrossIngs       Sediment deposition       Failing embankment       Slight (2° - 5°)       Obvious (>5°)       Roadway elevation:         Other:       Other (describe):       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         no       Local stream repair       Other:       Other:       BLOCKAGE Severity: (circle #)         If yes for fish barrier       Total       Partial       A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish: no fish passage device present.       A temporary barrier suc baever dam or a blocka above it; natural barriers as waterfalls.	TYPE: 🗌 Roa		l Crossi							
RAILROAD       Other:       Other:       Other:       Culvert       Culvert length:         CROSSINGS       CONDITION: (Evidence of)       Flat       Flat       Width:       Width:         ONLY       Sediment deposition       Failing embankment       Obvious (>5°)       Roadway elevation:       Roadway elevation:         Other (describe):       Obter (describe):       Obvious (>5°)       Roadway elevation:       Roadway elevation:         POTENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         no       Local stream repair       Other:       Other:       A structure such as a dam or road culvert on a 3rd order or or reat culvert on a 3rd order or or fraet stream movement of anadromous fish; no fish passage device present.       A temporary barrier suc base a dam or anadromous fish; no fish passage device present.       A temporary barrier suc base a dam or anadromous fish; no fish passage device present.       A temporary barrier suc base a dam or anadromous fish; no fish passage device present.       A temporary barrier suc base a dam or anadromous fish; no fish passage device present.       A temporary barrier suc base a dam or anadromous fish; no fish passage device present.       A temporary barrier suc base a dam or anadromous fish.       A temporary barrier suc base a dam or anadromous fish.       A temporary barrier suc base of an or a blockage that may interfere with the migration of anadromous fish.       A temporary barrier suc base of an or a blockage that	For Road/	Arch Bottor Box Ellipti Circular		☐ Single ☐ Double	Concrete		Flo No	w-aligned t flow-aligned	Barrel dia	ameter:(ft)
ONLY       Condition: (Evidence of)       Condition: (Evidence of)       Condition: (Evidence of)         Cracking/chipping/corrosion       Downstream scour hole       Flat       With:         Slight (2° - 5°)       Obvious (>5°)       Roadway elevation:         OnLY       Other (describe):       Dother (describe):       Roadway elevation:         POTENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         no       Local stream repair       Other:       Storage       Hotal fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish, no fish passage device present.       A total fish blockage that may interfere with the migration of anadromous fish.       A temporary barrier suc very little viable fish hat above it; natural barriers as waterfalls.		U Other:		Other:				not know	Culuent le	an other (ft)
POTENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         no       Local stream repair       Other:         Is SC ACTING AS GRADE CONTROL       No       Yes       Unknown         EXTENT OF PHYSICAL BLOCKAGE:       Total       Partial         Total       Partial       A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of andromous fish; no fish       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of assage device present.       A total fish movement of anadromous fish, no fish         fish barrier       CAUSE:       (in)       Significant reach of stream, or partial blockage that may interfere with the migration of assage device present.       A structure such as a dam or road adromous fish; no fish         fish barrier       CAUSE:       (in)       A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish.       A temporary barrier such as blockage that may interfere with the migration of addrese as waterfalls.         Other:       5       4       3       2       1		Cracking/chipping/c	orrosio				☐ Fla □ Slig	t ght $(2^{\circ} - 5^{0})$		Width:(ft)
Image: Noth Service of the service										()
EXTENT OF PHYSICAL BLOCKAGE:       BLOCKAGE SEVERITY: (circle #)         Total       Partial         Temporary       Unknown         If yes for       A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of a stream blocking the upstream movement of anadromous fish; no fish       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of a swaterfalls.       A temporary barrier such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of a swaterfalls.         Other:       5       4       3       2       1		RESTORATION CANDII	DATE				epair/rep	placement 🔲 I	Upstream s	torage retrofit
If yes for       Total       Partial         If yes for       Unknown         fish barrier       CAUSE:         Drop too high       Water Drop:         Image: State of the stat	IS SC ACTING	G AS GRADE CONTROI		No Y	es 🗌 Unk	now	n			
If yes for       Temporary       Unknown         If yes for       A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.       A total fish blockage that may interfere with the migration of anadromous fish.         Other:       5       4       3       2       1				OCKAGE:	I		BLO	CKAGE SEVEF	RITY: (circ	le #)
		□ Temporary       □         CAUSE:       □         □ Drop too high       W         □ Flow too shallow       W	Unknov Vater Di	rop:(in)	road culvert on a greater stream b upstream moven anadromous fish passage device	3rd or locking nent of ; no fis presen	rder or g the f sh it.	tributary that wou significant reach or partial blockag interfere with the anadromous fish.	ld isolate a of stream, e that may migration of	
	Notes/Sket				5		4	4 3		2 1
<b>Reported to authorities</b> Tyes										

Channel Modification

WATERSHED/S	SUBSHED:			DA	TE: /	/	ASSESSED BY:
SURVEY REAC	TH ID:		<b>TIME:</b> AM/PM	1	Рното ІІ	<b>D:</b> (Camera-Pic #)	/#
SITE ID: (Cond	ition-#)	START LAT°	' Long_	<u>ہ</u>	<u>'</u> ''	LMK	GPS: (Unit ID)
СМ		END LAT°	Long	0	· ··	LMK	_
TYPE: Char	nnelization	Bank armoring	Concrete channel	Floodpl	lain encroach	ment Other:	
MATERIAL:		Does channel hav	ve perennial flow?		Yes 🗌 No	<b>DIMENSIONS:</b>	
Concrete		Is there evidence	of sediment deposition?		Yes 🗌 No	Height Bottom Width	(ft) (ft)
☐ Rip Rap	Earthen	Is vegetation grow	wing in channel?		Yes 🗌 No	Top Width:	(ft) (ft)
Other:		0 0	cted to floodplain?		Yes 🗌 No	Length:	(ft)
			<u> </u>				
<b>BASE FLOW C</b>				AD	JACENT STR	REAM CORRIDO	R
Depth of flow		(in)		Ava	ailable widtl	h LT	(ft) RT(ft)
Defined low fl	ow channe	l? 🗌 Yes 🔲 No		Uti	lities Presen	ıt?	Fill in floodplain?
% of channel b	ottom	%			Yes 🗌 No		$\Box$ Yes $\Box$ No
POTENTIAL R	ESTORATIO	ON CANDIDATE [	Structural repair	Base flor	w channel cre	ation 🗌 Natural	channel design 🔲 Can't tell
no no		Γ	De-channelization	Fish barr	rier removal	🗌 Bioengi	neering
CHANNEL-		n of concrete stream (>500 e water is very shallow (<1		') ,but cha	annel stabilized a		annel less than 100 ft with good water al sediment bottom, and size and
IZATION SEVERITY:	deep) with no	natural sediments presen	beginning to function as a			shape similar	to the unchannelized stream reaches
(Circle #)	the channel.	5	4	3		above and be	low impacted area.
NOTES:		5	7	5		2	1
TIULES.							

WATERSHED/SUB	SHED:				<b>D</b> ATE:/	/	Assessed by:
SURVEY REACH I	D:		TIME:	AM/PM	Рното ID: (Ca	umera-Pic #)	/#
SITE ID: (Condition	n-#) <b>TR</b>	LAT_	<u> </u>	<u>'</u> '' Lon	G'	_'' LMK	GPS: (Unit ID)
Type: Industrial Commercial Residential	MATERIAL: Plastic Tires Appliances Automotive		onstruction ard Waste	☐ Metal ☐ Medical	SOURCE: Unknown Flooding Illegal dump Local outfall	LOCATION:	
POTENTIAL REST	ORATION CAND	IDATE	Stream of Stream	cleanup 🗌 Stre	am adoption segment	t 🗌 Removal/pr	evention of dumping
If yes for trash or	EQUIPMENT NEE	DED :	Heavy	equipment 🔲 🛛	Trash bags 🔲 Unkno	own	DUMPSTER WITHIN 100 FT:
debris removal	WHO CAN DO IT:		Volunte	_	<b>—</b> · · · · ·	eam 🗌 Other	Yes No Unknown
CLEAN-UP POTENTIAL: ( <i>Circle #</i> )	A small amount of t than two pickup truck inside a park with ea	(loads) loc	ated a long	asy access. Trash	or bulk items, in a small a may have been dumped o it could be cleaned up in small backhoe.	ver area, where ac	nt of trash or debris scattered over a large ccess is very difficult. Or presence of drums of hazardous materials
(enere #)	5			4	3	2	1
NOTES:						REDOPTE	D TO AUTHORITIES T VES T NO
						KEPORTE	D TO AUTHORITIES YES NO

# Utility Impacts UT

WATERSHED/SUBS	HED:		DATE:	<u> </u>	Ass	SESSED I	BY:		
SURVEY REACH II	):	,	TIME::	AM/PM	Рното І	ID: (Can	nera-Pic	#)	/#
SITE ID: (Condition-+	#) UT	LAT	o 1	"LONG	<u>ه</u> ا		LMK:		GPS: (Unit ID)
Type: Leaking sewer Exposed pipe Exposed manhole Other:	MATERIAL: Concrete Corrugated Smooth me PVC Other:	metal etal	LOCATION: Floodplain Stream bank Above streat Stream botto Other:	m CONDI Prote	FION: [	Joint f	failure	Diamete Length e	IMENSIONS: pr: <u>in</u> exposed: <u>ft</u> corrosion/cracking hole cover absent
				Othe	r:				
EVIDENCE OF DISCHARGE:									
POTENTIAL RESTO	RATION CANDII	DATE	Structural repa	urs 🗌 Pipe test	ing 🗌 Cit	tizen hotl	ines 🗌 D	rv weathe	er sampling
no no				moval 🗌 Othe	0			<b>J</b>	r o
If yes to fish barrier,	Water Drop:	(in)							
UTILITY IMPACT       Section of pipe undermined by erosion and could collapse in the near future; a pipe running across the bed or suspended above the stream; a long section along the edge of the stream where nearly the entire side of the pipe is exposed; or a manhole stack that is located in the center of the stream channel and there is evidence of stack failure.       A moderately long section of pipe is pipe is partially exposed but there is no immediate threat that the pipe will be undermined and break in the immediate future. The primary concern is that the pipe may be punctured by large debris during a large storm event.       Small section of exposed pipe, stream bank near the pipe is stable; the pipe is across the bottom of the stream but only a small portion of the top of the pipe exposed but is reinforced with concrete and it is not causing a blockage to upstream fish movement; a manhole stack that is at the edge of the stream and does not extend very far out into the active stream channel.									
Leaking= 5		5		4	3		2		1
NOTES:						Repo	PRTED TO L	OCAL AU	THORITIES 🗌 Yes 🗌 No

			Miscellar	neous
WATERSHED/SUBSHED:		DATE:/	Assessed by:	
SURVEY REACH ID:		TIME:AM/PM	<b>Рното ID:</b> ( <i>Camera-Pic #</i> )	/#
SITE ID: (Condition-#) MI	Lat°	' LONG°	' LMK:	GPS: (Unit ID)
POTENTIAL RESTORATION CANDIDA	ATE 🗌 St	torm water retrofit 🛛 Stream r	estoration 🔲 Riparian Manageme	nt
no	🗌 D	Discharge Prevention  Other:		
DESCRIBE:				
			<b>REPORTED TO LOCAL AU</b>	THORITIES 🗌 Yes 🗌 No

WATERSHED/SUBSHED:	DATE:/	Assessed by:	
SURVEY REACH ID:	<b>TIME:</b> AM/PM	<b>Рното ID:</b> ( <i>Camera-Pic #</i> )	/#
SITE ID: (Condition-#) MI LAT°	<u> </u>	''' LMK:	GPS: (Unit ID)
POTENTIAL RESTORATION CANDIDATE	orm water retrofit 🛛 Stream i	estoration 🔲 Riparian Manageme	nt
🗌 no	vischarge Prevention 🗌 Other:		
DESCRIBE:			
		<b>Reported</b> to local au	THORITIES 🗌 Yes 🗌 No

WATERSHED/SUBSHED:	DATE://	Assessed by:
SURVEY REACH ID:	<b>TIME:</b> AM/PM	<b>Рното ID:</b> ( <i>Camera-Pic #</i> ) /#
SITE ID: (Condition-#) MI LAT°	°' LONG°	' LMK: GPS: (Unit ID)
POTENTIAL RESTORATION CANDIDATE	torm water retrofit 🛛 Stream r	restoration 🔲 Riparian Management
🗆 no	Discharge Prevention  Other:	
DESCRIBE:		
		<b>Reported to local authorities</b> Yes No



SURVEY REACH I	D:	WTRS	HD/SUBSHD:			DATE:/	/	Assessed by	Y:
START TIM	ле::АМ/РМ <b>LMK:</b>			END	TIME:	AM/PM	LM	K:	GPS ID:
Lat'	Lo	NG	<u> </u>	LAT	<u> </u>	Long		<u>'</u> ''	
<b>Description:</b>				DESCRIP	TION:				
RAIN IN LAST 24 HO £ None	URS £ Heavy £ Interm		£ Steady rain £ Trace	PRESENT C £ Clear	ONDITIONS	£ Heavy rain £ Trace	£ Stea £ Ove	•	ermittent rtly cloudy
E None					acidantial	£ Suburban/Res	£ Fore		titutional
SURROUNDING LAN			e £ Park	£ Crop		£ Pasture	£ Othe		ututollai
Average	CONDITIONS	(check	applicable)		REACH	SKETCH AND SIT	те Імра	CT TRACKIN	1G
BASE FLOW AS % CHANNEL WIDTH	£ 0-25% £25-50 %		£ 50%-75% £ 75-100%		the survey red	of survey reach. Trac ach (OT, ER, IB,SC, deemed appropriate.	UT, TR, M	II) as well as an	y additional
<b>DOMINANT SUBSTR</b> £ Silt/clay (fine or £ Sand (gritty) £ Gravel (0.1-2.5	slick)	£ Boul £ Bed		-					
WATER CLARITY £ Stained (clear, no £ Other (chemicals,	aturally colored) dyes)	£O	paque (milky)						
AQUATIC PLANTS IN STREAM			É some É lots É some É lots						
WILDLIFE IN OR Around Stream	WILDLIFE IN OR (Evidence of)								
STREAM SHADING (water surface)	£ Mostly sha £ Halfway ( £ Partially sh £ Unshaded	≥50%) haded (≥							
CHANNEL	Downcut	-	Bed scour						
DYNAMICS	Widening	-	Bank failure						
Unknown	Headcutti	g	Bank scour Slope failure Channelized						
Channel Dimensions	Height: LT b RT b		(ft)						
(FACING DOWNSTREAM)	Width: Bott	om	(ft)						
	Тор		(ft)						
R	REACH ACCESS			4					
Good: Open area in	Fair: Forested or developed area		vifficult. Must cross vetland, steep slope, or						
public ownership, sufficient room to	adjacent to strea Access requires	im. se	ensitive areas to get to tream. Few areas to						
stockpile materials, easy stream channel	removal or impac	ct to st	tockpile available						
access for heavy	landscaped area Stockpile areas		nd/or located a great istance from stream.						
equipment using existing roads or trails.	small or distant f	rom S	pecialized heavy						
5 4	stream.	2 e	quipment required.	4					
NOTES: (biggest prob			ach)	1					
						REPOR	TED TO A	AUTHORITIES [	YES NO

		<b>OVERALL STREAM CONDI</b>	TION	
	Optimal	Suboptimal	Marginal	Poor
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding at a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	Over	ALL BUFFER AND FLOODPLAI	IN CONDITION	
	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Sub Total In-st	ream:/80 + B	uffer/Floodplain:/80	= Total Survey	Reach/160

#### Photo Inventory (By Camera)

Project:	This field sheet is to be completed AS photos are taken in the field. The intent is to
Group:	force us to organize pictures taken on a camera basis. Fill out one sheet per camera (add sheets as needed). Only fill in Date/Reach/Location ID when you start in a
Camera:	new spatial or temporal location.

Date	Stream/ Reach	Location ID	Photo #	Description

Date	Stream/ Reach	Location ID	Photo #	Description

**Comments:** 

	Reach Level Assessment RCH
SURVEY REACH ID: TB-OI WTRSHD/SUBSHD:	UER BK DATE: 7/1 08 ASSESSED BY:
START TIME: 3:00 AM/PM LMK: LAT <u>M</u> • <u>M</u> • <u>77</u> " LONG <u>72</u> • <u>20</u> • <u>16</u> " DESCRIPTION: Conf. W/ UTR	ENDTIME: $U : 00$ AM/PMLMK:GPS ID:LAT $U \circ U \circ 1 \circ $
RAIN IN LAST 24 HOURS Heavy rain     Steady rain       None     Intermittent     Trace	PRESENT CONDITIONS       Heavy rain       Steady rain       Intermittent         Clear       Trace       Overcast       Partly cloudy
SURROUNDING LAND USE:  Industrial Golf course Park	□ Urban/Residential □ Suburban/Res □ Crop □ Pasture □ Other:
AVERAGE CONDITIONS (check applicable)	REACH SKETCH AND SITE IMPACT TRACKING
BASE FLOW AS %         □ 0-25%         □ 50%-75%           CHANNEL WIDTH         □ 25-50 %         □ 75-100%	Simple planar sketch of survey reach. Track locations and IDs for all site impacts within the survey reach (OT, ER, IB,SC, UT, TR, MI) as well as any additional features deemed appropriate. Indicate direction of flow
DOMINANT SUBSTRATESilt/clay (fine or slick)Sand (gritty)Gravel (0.1-2.5")Bed rock	
WATER CLARITY Clear Turbid (suspended matter) Stained (clear, naturally colored) Opaque (milky) Other (chemicals, dyes)	SC-04
AQUATIC PLANTS       Attached:       none       some       lots         IN STREAM       Floating:       none       some       lots	
WILDLIFE IN OR       (Evidence of)         AROUND STREAM       IFish       Beaver       Deer         JSnails       Other:	56-03
STREAM SHADING (water surface) $\Box$ Mostly shaded ( $\geq$ 75% coverage) $\Box$ Halfway ( $\geq$ 50%) $\Box$ Partially shaded ( $\geq$ 25%) $\Box$ Unshaded (<25%)	for-1
CHANNEL       Downcutting       Bed scour         DYNAMICS       Widening       Bank failure         Headcutting       Bank scour       Bank scour         Unknown       Sed. deposition       Channelized	50°2
CHANNEL DIMENSIONSHeight: LT bankZ (ft)DIMENSIONS (FACING 	51.07 1
REACH ACCESSIBILITY	and 11
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas.Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/or located a great distance from stream.543(2)1	Read (
	- C watched
Toiling in dustrial - eva	antestructure
	REPORTED TO AUTHORITIES YES NO

	Optimal	Suboptimal	Marginal	Poor
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	20 19 18 17 16	15 4 13 12 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetatior has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
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BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	The second s	ALL BUFFER AND FLOODPLAI		
	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
<u></u>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

	( WOR			S	evere Bank I	<b>∃ros</b> ion	ER
WATERSHED/SUBS	SHED: Fratter	Brk		DATE://	108 ASS	ESSED BY:	KR
SURVEY REACH:	TBOI	······································	15 AM/PM)	РНОТО ID (CAM		/#	
SITE ID: (Condition-		1	" LONG 72 ° 2		LMK	GPS: (L	Init ID)
ER- OI	END LAT		LONG <u>2</u> "LONG °		LMK		mii 1D)
PROCESS:	Currently unknown			🛛 RT 🔲 Both (l			
Downcutting	Bed scour	LOCATION:	🛛 Meander bend	Straight section	Steep slope/v	alley wall	] Other:
U Widening	·X Bank failure	DIMENSIONS			-		a
Headcutting	Bank scour	1	<i>GPS</i> ) LTft	and/or RT_5	*	ttom width	
Aggrading	Slope failure	Bank Ht	LTft	and/or RT	<u><i>O</i></u> ft To	p width	<u>20 ft</u>
Sed. deposition	Channelized	Bank Angle	LT	and/or RT 9	<u>2</u> ° We	etted Width	<u> 0</u> ft
LAND OWNERSHIP	Private 🗌 Publi	c 🔀 Unknown	LAND COVER:	Forest F	ield/Ag 🗌 De	veloped:	
POTENTIAL RESTO	ORATION CANDIDATI	E: Grade		Bank stabilizatior	1		
THREAT TO PROP	ERTY/INFRASTRUCT	URE: 🕅 No	Yes (Describ	e):			
EXISTING RIPARIA	AN WIDTH:	⊠ ≤25 ft	25 - 50 ft	] 50-75ft	-100ft 🗌 >1	00ft	
EROSION	Active downcutting; tall ban	ks on both sides	Pat downcutting evide	nt. active stream			
SEVERITY(circle#)	of the stream eroding at a f contributing significant amo		widening, banks active	ely eroding at a	Grade and width s failure/erosion; like		
	stream; obvious threat to pr infrastructure.	operty or	moderate rate; no thre infrastructure	eat to property or	scour, impaired rip		
Channelized= 1	5		4 3	>	2	1	
ACCESS:	Good access: Open area i ownership, sufficient room i materials, easy stream cha heavy equipment using exist trails.	o stockpile nnel access for	Fair access: Forestec adjacent to stream. Ac removal or impact to la	l or developed area ccess requires tree	Difficult access. I other sensitive are stockpile areas av distance from strea	as to access stre ailable and/or loc am section. Spe	eam. Minimal ated a great
	5	(4	3		equipment require	<u>a.</u> 1	• · · · · · · · · · · · · · · · · · · ·
NOTES/CROSS SEC	CTION SKETCH:	A	bank being Stabilized trees, roo are han out of	lby its ngjing bjank			
)					REPORTED TO A	UTHORITIES	Yes N

e

						Stre	am Cros	sing SC
WATERSHED	SUBSHED: JAnta	Tucker		DATE	E: 7	11/08	ASSE	SSED BY:
JURVEY REA	CHID: TB01	TIME: 4:60	AM/RM	Рнот	TO ID:	: (Camera-Pio	k	/#
SITE ID: (Con	udition-#) SC- <u>[7U</u> LAT	41.49.18	$\sim$ " Long 7	2.2	9.	<u> 2</u> " LI	МК	GPS (Unit ID)
TYPE: X Roa		ng Manmade		1				
For Road/ Railroad	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS: Single Double Triple Other:	MATERIAL:	ļ	Flov Not	MENT: <i>w</i> -aligned flow-aligned not know	Barrel dia	Height:(ft)
CROSSINGS ONLY	CONDITION: (Evidence of)	n 🖾 Downstrear		ļ	X Flat □ Slig	ERT SLOPE: ht (2° – 5 ⁰ ) rious (>5°)		elevation: $100$ (ft) Width: (ft) 155 (ft)
[								
POTENTIAL ]	RESTORATION CANDIDATE	Fish barrier re		-	air/rep	lacement 🔲 🛛	Jpstream st	orage retrofit
IS SC ACTIN	G AS GRADE CONTROL	X No Y	es 🗌 Unkr	nown				
	EXTENT OF PHYSICAL BLO	OCKAGE:	[		BLOG	CKAGE SEVEI	RITY: (circ	le #)
If yes for fish barrier	Total      Partial     Temporary Unkno     CAUSE:     Drop too high Water D     Flow too shallow Water D     Other: ℓ CUCS @ dS	rop: (in) epth: (in)	A structure such a road culvert on a 3 greater stream blc upstream moveme anadromous fish; passage device pu	Brd orde ocking th ent of no fish	eror	A total fish blocka tributary that wou significant reach or partial blockag interfere with the anadromous fish.	Id isolate a of stream, e that may migration of	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.
NOTES/SKET				/	· · ·		λ <b>Λ</b>	
NUTES/SKET		Dtor T		J.	roc eve miling torr	the disc	patres 1	×
) _)			Centut			DEBOD	Т <b>е</b> в то 411	<b>THORITIES</b> YES NO
	·····					ILLI UN	IU AU	

		D a			Strea	am Cros	asing SC	
WATERSHED	SUBSHED: Tanter	Tucker		ате: 7	11 108	ASSE	SSED BY: $\not\models \beta$	
URVEY REA		TIME: 3 : 57			: (Camera-Pic		/#	
SITE ID: (Cor	ndition-#) SC- <u>Ø3</u> LAT	410-44-1	<u>"</u> LONG 72	<u>14</u>	<u>14"</u> LI	ИК	GPS (Unit ID)	
TYPE: X Ro	ad Crossing 🔲 Railroad Crossi	ng 🗌 Manmade I	Dam 🔲 Beaver I	Dam 🗌	Geological Form	nation 🔲	Other:	
FOR ROAD/ RAILROAD	SHAPE: Arch Bottomless Box Elliptical Circular Other:	Arch     Bottomless     Single       Box     Elliptical     Double       Circular     Triple			ALIGNMENT:       Image: Second structure       Image: Second		DIMENSIONS: (if variable, sketch) Barrel diameter:(ft) Height:(ft)	
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	n 🖄 Downstream □ Failing emb		CULVERT SLOPE: $\Box$ Flat Slight (2° – 5°) $\Box$ Obvious (>5°)		Culvert length: <u>20</u> (ft) Width:(ft) Roadway elevation: <u>10</u> (ft		
POTENTIAL D	RESTORATION CANDIDATE	Fish barrier re	emoval 🔀 Culvert repair 🔲 Other:	repair/rep	blacement 🔲 U	Jpstream st	torage retrofit	
IS SC ACTIN	G AS GRADE CONTROL		es 🗌 Unknov					
If yes for fish barrier				BLOCKAGE SEVER ructure such as a dam or d culvert on a 3rd order or the stream blocking the tream movement of dromous fish; no fish sage device present. A total fish blockage interfere with the r anadromous fish.			A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.	
Nome	Other:		5		4 3		2 1	
NOTES/SKET	scoving of bed scoving of bed ignificant scovin	itment.	~1 deck ming do	type	Crossin	ĥ		
9	ignitiant scound	ng near	and 'nnd	ler	pilings	on ab	outments	
۵	$\rightarrow Q$							
		51	corring					
					Repor	TED TO AU	THORITIES 🗌 YES 🗍 NO	

					Storm	Water Outfall	
	HED: tucher			DATE: <u>7/</u>	108	ASSESSED BY:	DB
SURVEY REACH II	a second	<u>me: 3 : 15 am/</u>	Colligner.	Рното ID: (Cam	nera-Pic #)	L	
SITE ID (Condition:#)	): <b>OT-<u>0</u> </b> LA	<u>x41°49.2</u>	<u>5</u> "Lo	NG 12º 29 !	14 "	LMK	GPS: (Unit ID)
BANK: LT ART Hea FLOW: None Trick Moderate	Closed	MATERIAL:	]Metal ]Brick , P	SHAPE: Si Circular D Elliptical T Other:	Double	DIMENSIONS: Diameter: <u>\Z(ir</u>	SUBMERGED:
Substantial	Dpen channel	Concrete II I	Earthen	☐ Trapezoid ☐ Parabolic ☐ Other:		:: <u>(in)</u> (Top): <u>(in)</u> ottom): <u>(in)</u>	NOT APPEICABLE
CONDITION:	ODOR: XNO Gas Sewage Rancid/Sour Sulfide	<b>DEPOSITS/STAIN</b> None Oily Flow Line Paint	NS:	VEGGIE DENSITY	Y: PI	PE BENTHIC GR	nge 🗌 Green
Other:	Other:	Other:		C Excessive Other:		Good Odors Suds Algae Other:	Colors Coils
ONLY   FLO.     OTHER   E	BIDITY: None	Slight Cloudir Sewage (toilet stic bags)	ness [	Cloudy Opa c.) Petro (bulk) Exce	que bleum (oil s essive Sedin	nge 🗌 Red 🔲 G sheen) 👘 🗍 G mentation	
POTENTIAL RESTOR	<b>7</b> .	Storm water ret	rofit	Other: Kemer	n/2 I	Docsn't seem	to him use
If yes for stormwater Is stormwater currently	r: y controlled?	Land	Use desc	ription:		p c .	
OUTFALL SEVERITY: (circle #)	ot investigated Heavy discharge with a disti strong smell. The amount of compared to the amount of r stream; discharge appears to significant impact downstrea	nct color and/or a discharge is significant normal flow in receiving o be having a m.	discharge discharge flow and a	charge; flow mostly clean has a color and/or odor, is very small compared any impact appears to be	, the amount o to the stream'	s base discharge;	s not have dry weather staining; or appearance any erosion problems.
SKETCH/NOTES:	5		4	3		2	
SKEICH/NUIES:		20	F-01				
)			• •		REPOR	TED TO AUTHORI	TIES: 🗌 YES 🗌 NO

	SUBSHED	- Incruc		DATE: 7/1/C	Assessed by: CB		
SURVEY REAC	H ID:	B-01 TI	ME: 2:45 AM/M	Рното ID: (Camera-F	Pic #) /#		
SITE ID (Conditi	ion-#): <b>O</b>	Г- <u>02</u>   LA	<u>ат 41° 49 · 22 "</u>		" LMK GPS: (Unit ID)		
	Head Trickle	TYPE:	MATERIAL: Concrete Meter PVC/Plastic Bride Other:		e DIMENSIONS: SUBMERGED: Diameter: (in) Partially Fully		
Moderate Substantial Other:		Open channel	Concrete 🕅 Eartho	Parabolic V	Depth: $3C(in)$ Width (Top): $5H(in)$ " (Bottom): (in)		
CONDITION:		<b>ODOR:</b> NO Gas Sewage	<b>DEPOSITS/STAINS:</b> None Oily Flow Line	VEGGIE DENSITY:	PIPE BENTHIC GROWTH:       Diamon         Brown       Orange       Green         Other:       Other:       Other:		
<ul> <li>Peeling Paint</li> <li>Corrosion</li> <li>Other:</li> </ul>				<ul> <li>Inhibited</li> <li>Excessive</li> <li>Other:</li> </ul>	POOL QUALITY:       Image: Colors         Good       Odors         Good       Odors         Suds       Algae         Floatables         Other:		
FLOWING ONLY OTHER		BLES: None ss Trash (paper/pla	Slight Cloudiness Sewage (toilet pape (toilet pape)	Cloudy     Opaque       er, etc.)     Petroleum       ving (bulk)     Excessive	Orange Red Other:		
FLOWING ONLY OTHER CONCERNS: POTENTIAL RE	TURBIDI FLOATAI Exces	IV:    ILES:    None    STrash (paper/plass Regular Mainten	Slight Cloudiness     Sewage (toilet pape stic bags)      Dump ance     Bank l      Discharge investiga	Cloudy       Opaque         er, etc.)       Petroleum         bing (bulk)       Excessive         Erosion       Other:         ation       Stream daylighting	(oil sheen) Other: e Sedimentation		
FLOWING ONLY OTHER CONCERNS: POTENTIAL RE	TURBIDI FLOATAH Excess Needs	IV:    ILES:    None    STrash (paper/plass Regular Mainten	Slight Cloudiness     Sewage (toilet pape stic bags) Dump ance Bank I	Cloudy       Opaque         er, etc.)       Petroleum         bing (bulk)       Excessive         Erosion       Other:         ation       Stream daylighting	(oil sheen) Other:		
FLOWING ONLY OTHER CONCERNS: POTENTIAL RE Ono	TURBIDI FLOATAH Excess Needs	IV:     Image: None       SILES:     Image: None       SS Trash (paper/plass regular Mainten       S Regular Mainten	Slight Cloudiness     Sewage (toilet pape stic bags)      Dump ance     Bank l      Discharge investiga	Cloudy Opaque er, etc.) Petroleum bing (bulk) Excessive Erosion Other: ation Stream daylighting Other:	(oil sheen) Other: e Sedimentation		
FLOWING ONLY         OTHER         CONCERNS:         POTENTIAL RE         M no         If yes for daylighted to be a storm watched to be a storm wa	TURBIDI FLOATAI Excess Needs STORAT <i>ive</i> cover <i>water:</i> rently cor	IY: None BLES: None strash (paper/pla s Regular Mainten ION CANDIDATE from outfall:	Slight Cloudiness     Sewage (toilet pape stic bags) Dump ance Bank I     Discharge investiga     Storm water retrofit     ft Type of ex	Cloudy       Opaque         er, etc.)       Petroleum         ping (bulk)       Excessive         Erosion       Other:         ation       Stream daylighting         Other:       Other:         xisting vegetation:	(oil sheen) Other:		
FLOWING ONLY OTHER CONCERNS: POTENTIAL RE no If yes for daylig	TURBIDI FLOATAI Excess Needs STORAT <i>hting:</i> tive cover <i>water:</i> rently cor Not ir Heavy strong comp strear	IY:     None       SLES:     None       SS Trash (paper/plastic stress)     None       SRegular Mainten     None       ION CANDIDATE     None       from outfall:     None       ntrolled?     None       nvestigated     Vischarge with a distignment of smell.	Slight Cloudiness     Sewage (toilet pape stic bags)      Dump ance     Discharge investiga     Storm water retrofit     ft Type of ex Land Use     Area availa     discharge is significant normal flow in receiving     o be having a	Cloudy       Opaque         er, etc.)       Petroleum         ping (bulk)       Excessive         Erosion       Other:         ation       Stream daylighting         Other:       Other:         xisting vegetation:	(oil sheen)       Other:         e Sedimentation         Image: Local stream repair/outfall stabilization         Image: Slope:		
FLOWING ONLY         OTHER         CONCERNS:         POTENTIAL RE         M no         If yes for daylighted and the second and th	TURBIDI FLOATAT Excess Needs STORAT <i>ive</i> cover <i>water:</i> rently cor Not ir Heavy strong comp strear signifi	IV: None BLFS: None strash (paper/pla s Regular Mainten ION CANDIDATE from outfall: trolled? ivestigated y discharge with a disti p smell. The amount of ared to the amount of i n, discharge appears t	Slight Cloudiness     Sewage (toilet pape stic bags)      Dump ance     Discharge investiga     Storm water retrofit     ft Type of ex Land Use     Area availa     discharge is significant normal flow in receiving     o be having a	Cloudy Opaque er, etc.) Petroleum oing (bulk) Excessive Erosion Other: ation Stream daylighting Other: xisting vegetation: description: able: all discharge; flow mostly clear and o charge has a color and/or odor, the an charge is very small compared to the s	(oil sheen)       Other:         e Sedimentation         Image: Local stream repair/outfall stabilization         Image: Slope:		
FLOWING ONLY         OTHER         CONCERNS:         POTENTIAL RE         D no         If yes for daylight         Length of vegetatt         If yes for stormv         's stormwater cum         'Yes [] No         OUTFALL         SEVERITY:         'circle #)	TURBIDI FLOATAI Excess Needs STORAT Atting: tive cover water: rently cor Not ir Heavy strong comp strear signifi	IY:       Image: None         BLFS:       Image: None         Start       Image: None         Ion Candidation       Image: None         from outfall:       Image: None         Introlled?       Image: None         Investigated       Image: None         Investigated       Image: None         Investigated       Image: None         Image: None       Image: None	Slight Cloudiness     Sewage (toilet paper     Sewage (toilet paper)     Sewa	Cloudy       Opaque         er, etc.)       Petroleum         ping (bulk)       Excessive         Erosion       Other:         ation       Stream daylighting	(oil sheen)       Other:         e Sedimentation         I Local stream repair/outfall stabilization         Slope:       °         Slope:       °         Outfall does not have dry weather discharge; staining; or appearance of causing any erosion problems.		

8	Stream	n Cros	ssing

						Stre	am Cros	sing	SC
WATERSHED	)/SUBSHED: Tucher B.	k	~	DAT	E: 7	11 106	ASSE	SSED BY:	DE
URVEY REA		TIME: 2 : 70				: (Camera-Pie		/#	39
SITE ID: (Cor	ndition-#) SC- <u>01</u> (LAT	11º 40.7,	5 " LONG 7	201	29.	15 " L	MK	GPS	<b>S</b> (Unit ID)
	ad Crossing 🔲 Railroad Crossin		Dam 🗌 Beave	er Dan	n 🗌 (	Geological For	nation 🗌	Other:	
For Road/ Railroad	SHAPE: Arch Bottomless Box Elliptical Circular Other: Abot with Atch	# BARRELS: Single Double Triple Other:	MATERIAL:	1	Flov Not	IMENT: w-aligned flow-aligned not know	Barrel dia	meter: <i>H</i> eight:	rariable, sketch) <u>5</u> (ft) <u>NA</u> (ft) 707 (6)
CROSSINGS ONLY					$\Box Flat$ $\Box Slight (2^{\circ} - 5^{0})$			Culvert length: <u>20</u> (ft) Width:(ft) Roadway elevation: <u>NA</u> (ft	
POTENTIAL	RESTORATION CANDIDATE	Fish barrier re		-	oair/rep	lacement 🔲 l	Jpstream st	orage retr	ofit
IS SC ACTIN	G AS GRADE CONTROL		es 🗌 Unkı	nown					
	EXTENT OF PHYSICAL BLO	CKAGE:	[		BLOG	CKAGE SEVEI	RITY: (circ	le #)	
If yes for fish barrier	Flow too shallow Water De	op: (in) pth: (in)	A structure such as a dam or road culvert on a 3rd order or greater stream blocking the upstream movement of anadromous fish; no fish passage device present.		eror	A total fish blockage on a tributary that would isolate a significant reach of stream, or partial blockage that may interfere with the migration of anadromous fish.		beaver dar the very he very little v	ry barrier such as a n or a blockage at ead of a stream with iable fish habitat atural barriers such lls.
	C Other: TLOUDDIAIN	ENCROAL HY	<u>MENT 5</u>		4	3		2	1
NOTES/SKET	ГСН:		,	0009394 6 - 1 - 1000 		Cn C			5 🗌 Yes 🗌 No

undi,

		2			Stre	am Cros	ssing SC	
WATERSHED/	SUBSHED: TANKER	Tuckon	Г	DATE: 7	11/08	ASSE	SSED BY: KB	
URVEY REAG		TIME: 3:20			: (Camera-Pi	1.000	/#	
and seeing the second second	A CONTRACT AND A	41.49.20				MK	GPS (Unit ID)	
							- 1 、 ,	
TYPE: Roa	<del>d Crossin</del> g 🕅 Railroad Cross	ing 🔲 Manmade I	Dam 🗌 Beaver	Dam	Geological For	nation 🗌	Other:	
For Road/ Railroad	SHAPE:         Arch       Bottomless         Box       Elliptical         Circular         Other:	# BARRELS: Double Triple Other:	MATERIAL: Concrete Metal Other:	K Flo	NMENT: w-aligned t flow-aligned not know	Barrel dia	IONS: (if variable, sketch) ameter: 6 (ft) Height: 6 (ft) 125	
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosic Sediment deposition Other (describe):	on 🕅 Downstrean	n scour hole	Fla Slig	ERT SLOPE: t ght (2° – 5 ⁰ ) vious (>5°)		ength:(ft) Width:(ft) elevation:(ft)	
POTENTIAL R	ESTORATION CANDIDATE	Fish barrier re	emoval 🗌 Culver		lacement 🔲 I	Jpstream st	torage retrofit	
IS SC ACTING	AS GRADE CONTROL			own				
	EXTENT OF PHYSICAL BL			BLO	CKAGE SEVEI	RITY: (circ	le #)	
If yes for fish barrier	Total Partial Temporary Unknown		A structure such as a road culvert on a 3rc greater stream block upstream movement anadromous fish; no passage device pres	d order or king the t of o fish	rder or g the significant reach of stream, or partial blockage that may interfere with the migration of		A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.	
NOTES/SKETC	Other:		5	4	3		2 1	
		then Ay						
	f glore archi	guz						
	Stor					11		
)					REPOR	TED TO AU	THORITIES 🗌 YES 🖉 NO	

	_ /				Impacted Bu	uffer	IB
WATERSHED/SUBSHED: Form	Ker BRK			D			1.0
JRVEY REACH: TBOI	rec pick	TIME: 7	:04_AM/PM)	DATE: 7		SESSED	
SITE ID: (Condition-#) STAR	r LAT 41 049		LONG 72°29		): (Camera-Pic #)	-	/# <u>35,3</u> <u>(</u> (Unit ID)
IB- <u>01</u> END	$\frac{1}{LAT} + \frac{1}{1}$		$\frac{10 \log 12^{\circ} U}{10 \log 2^{\circ}}$	1 11	LMK	- 01.5.	(0///12)
		1	20NG		LMK		
IMPACTED BANK:     REAS       LT     LT       Both	ON INADEQUATE:	Lack of Recently	vegetation 🗶 To planted 🛛 Oth	o narrow 🔲 her: Bridge	Widespread invasive 2. abutvnent	• ,	namall
LAND USE: Priva	te Institutional			ther Public		1	
		L					
·	aved Bare ground	L I Turf/lav	wn Tall grass	: Shrub/scrub	Trees Other		
		Num num	, U				
RT Bank						ROAN	DWAY
INVASIVE PLANTS:	None 🗌 Rare	🗌 P	artial coverage	Extens	ive coverage 🛛 🙀 unl	known	
STREAM SHADE PROVIDED?	🖾 None 🗌 Part	ial 🗌	Full WETL	ands Prese	ENT? XNO IN	les □l	Jnknown
POTENTIAL RESTORATION CA	NDIDATE Activ		on Greenway o	lesign 🕅 N	atural regeneration	] Invasivo	es removal
<b>RESTORABLE AREA</b>			Impacted area on pu	blic land Im	pacted area on either	Impacted	area on private
LT BANK RT Length (ft): $UO$ $3O$ $Circle #)$		STATION where the riparian are		rea does public or private land that is ed for any presently used for a specific enty of purpose; available area for		land where road; building encroachment or other feature significantly limits available area for planting	
" "Vidth (ft):			5	4	3	2	<u> </u>
POTENTIAL CONFLICTS WITH F			despread invasive vere animal impact	plants 🔲 🛛	Potential contaminatio er) 🔲 Other:	n 🗌 La	ack of sun
NOTES:	1	_					
left bank co right bank	mid be ve ft npsteam has brid	stred has ge ab	concrete a atwent,	the g butner ho po	vass/scrub nt_ approx ssible rest	15-Ft ovati	- long
Concrete Concrete Concrete Concrete Concrete Concrete Concrete Concrete Concrete							

Reach Level Assessment RCH

SURVEY REACH	ID: <u>B-02</u> WTRSHI	/SUBSHD:	THERE BK	Date: 7/	Asses	SSED BY:
START TIM		LMK:	END TIME:	:AM/PM	LMK:	GPS ID:
LATMI · UC ·	<u>15</u> " Long <u>72</u> °_	29.11"	Lat''	" LONG	°ł	''
<b>DESCRIPTION:</b>			DESCRIPTION:			
RAIN IN LAST 24 HO		Steady rain	PRESENT CONDITIONS			
		Trace		N	□ Steady rain □ Overcast	□ Intermittent □ Partly cloudy
SURROUNDING LAN	DUSE:  Industrial Golf course	□ Commercial □ Park	□ Urban/Residential □ Crop	Suburban/Res	Forested Other:	
Averagi	E CONDITIONS (check app	olicable)	REACH	SKETCH AND SITE	IMPACT TR	ACKING
BASE FLOW AS % CHANNEL WIDTH		] 50%-75% □ 75-100%	within the survey rea	of survey reach. Track ach (OT, ER, IB,SC, UT deemed appropriate. In	T, TR, MI) as we	ell as any additional
<b>DOMINANT SUBSTR</b> Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5)	slick)  Cobble Boulde	r (>10")			uicuie un ecnoi	n 0j jiow
WATER CLARITY	☐ Clear □Turbid (susp aturally colored) □ Opac dyes)	pended matter) que (milky)				
AQUATIC PLANTS IN STREAM	Attached: Attached D			Sector Provide Andrease Sector Provide Andreas		
Wildlife in or Around Stream	(Evidence of) □ Fish □ Beaver □ Snails □ Other:	Deer		11		
STREAM SHADING (water surface)	Mostly shaded (≥75% Halfway (≥50%) □ Partially shaded (≥25 □ Unshaded (< 25%)	0,1				
CHANNEL DYNAMICS	Downcutting Widening Headcutting Sed. deposition	Bed scour Bank failure Bank scour Slope failure Channelized				
CHANNEL DIMENSIONS (FACING DOWNSTREAM)	Height: LT bank RT bank Width: Bottom	2 (ft) 2 (ft) 15 (ft)		re verit innerna de facción insigne, adama de		
	Top EACH ACCESSIBILITY	<u>(ft)</u>	DEC HADRED WAY	Sc. Survey and Handley		
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.	Fair: Forested or developed areaDiffic wetlaadjacent to stream.sensiAccess requires treestrearremoval or impact tostock landscaped areas.Stockpile areasdistarsmall or distant from stream.speci	rult. Must cross nd, steep slope, or tive areas to get to m. Few areas to pile available r located a great nce from stream. alized heavy ment required.			-	
	lem you see in survey reach)	A	· · · · · · · · · · · · · · · · · · ·	in ST		
DI	NOT W	AK I	FACH.	TB-01 - 174FC		ITED
	-125-			Reportei	D TO AUTHORI	TIES YES NO
1	1 222					

	Optimal	Suboptimal	Marginal	Poor
)N-STREAM HABITAT (May modify criteria based on appropriate	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may	ior full colonization potential; the habitat for maintenance of tions; presence of additional the in the form of newfall, but prepared for colonization (may	
habitat regime)	that are <u>not</u> new fall and <u>not</u> transient).	rate at high end of scale).	10 9 8 7 6	5 4 2 2 1 2
VECETATIVE			10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION         More than 90% of the streamban surfaces and immediate riparian covered by native vegetation, inc trees, understory shrubs, or nonw macrophytes; vegetative disruptic through grazing or mowing minim not evident; almost all plants allow grow naturally.		70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambani surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetatio has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK     Banks stable; evidence of err       BCOSION     or bank failure absent or mir       (facing     little potential for future problem       downstream)     <5% of bank affected.		Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN Connection	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
<u> </u>		ALL BUFFER AND FLOODPLAI		
	Optimal	Suboptimal	Marginal	Poor
VEGETATED 3uffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
LOODPLAIN EGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
TLOODPLAIN Iabitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
^S LOODPLAIN ^S NCROACH- IENT	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function
	20 19 18 17 16	(15)14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

	Reach Level Assessment RCH
SURVEY REACH ID: 72-63 WTRSHD/SUBSHD:	DATE: 71108 ASSESSED BY:
START         TIME: 90 AM/PM         LMK:           LAT         10 44 '51 ''         LONG 72 °29 '14 ''	END       TIME: $\frac{1/2}{2}$ : $\frac{1}{270}$ AM/PM       LMK:       GPS ID:         LAT_1       ° $\frac{1}{24}$ ''       LONG $\frac{7}{22}$ ' $\frac{7}{26}$ '' $\frac{1}{276}$ ''
DESCRIPTION: IND OF 756. LIV	DESCRIPTION: PLACINY RD
	PRESENT CONDITIONS       Image: Heavy rain       Image: Steady rain       Image: Image: Image: Steady rain         Image: Clear       Image: Trace       Image: Overcast       Image: Partly cloudy
	□ Urban/Residential
AVERAGE CONDITIONS (check applicable)	REACH SKETCH AND SITE IMPACT TRACKING
Base Flow as %         □ 0-25%         □ 50%-75%           CHANNEL WIDTH         □ 25-50 %         □ 75-100%	Simple planar sketch of survey reach. Track locations and IDs for all site impacts within the survey reach (OT, ER, IB,SC, UT, TR, MI) as well as any additional features deemed appropriate. Indicate direction of flow
DOMINANT SUBSTRATE         Silt/clay (fine or slick)         Sand (gritty)         □ Boulder (>10")         □ Bed rock	150 Fail - Ets PIRFLINE 150 (deared) (alconated)
WATER CLARITY Clear Turbid (suspended matter) Stained (clear, naturally colored) Opaque (milky) Other (chemicals, dyes)	1 Weareal Incontraction )
AQUATIC PLANTSAttached: $\square$ none $\square$ some $\square$ lotsIN STREAMFloating: $\square$ none $\square$ some $\square$ lots	
WILDLIFE IN OR       (Evidence of)         AROUND STREAM       Around Stream	A TITEROL
STREAM SHADING       Image: Mostly shaded (≥75% coverage)         (water surface)       Image: Halfway (≥50%)         Image: Mostly shaded (≥25%)       Image: Halfway (≥50%)         Image: Mostly shaded (≥25%)       Image: Halfway (≥50%)         Image: Mostly shaded (≥25%)       Image: Halfway (≥50%)	13-ch
CHANNEL     Downcutting     Bed scour       DYNAMICS     Widening     Bank failure       Headcutting     Bank scour       Aggrading     Slope failure	C C Contractor C S A C C
Unknown Sed. deposition Channelized	TEN WEIGHT
CHANNELHeight: LT bank2(ft)DIMENSIONSRT bank3(ft)	
(FACING Width: Bottom (ft)	
Top(ft) REACH ACCESSIBILITY	Wds //
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavyFair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas.Difficult. Must cross wetland, steep slope, or sensitive areas to get to 	The state of the s
existing roads or trails.     small or distant from stream.     Specialized heavy equipment required.       5     4     3     2     1	
NOTES: (biggest problem you see in survey reach)	
NOTES: (biggest problem you see in survey reach)	
J	<b>REPORTED TO AUTHORITIES</b> YES NO

	Optimal	Suboptimal	Marginal	Poor		
N-STREAM HABITAT (May modify	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently	Less than 20% stable habitat; lack		
criteria based on appropriate habitat regime)	stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	disturbed or removed.	unstable or lacking.		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
VEGETATIVE PROTECTION         More than 90% of the streambank surfaces and immediate riparian zor covered by native vegetation, includ trees, understory shrubs, or nonwoor macrophytes; vegetative disruption through grazing or mowing minimal not evident; almost all plants allower grow naturally.		70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
	Left Bank 10 9	8 7 6	<b>3</b> 4 3	2 1 0		
	Right Bank 10 9	8 7 6	3 4 3	2 1 0		
BANK         Banks stable; evidence of erosion or bank failure absent or minima little potential for future problem downstream)		Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.		
	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) <b>not</b> able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.		
	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0		
	Over	ALL BUFFER AND FLOODPLAI	N CONDITION			
	Optimal	Suboptimal	Marginal	Poor		
Vegetated Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.		
	Left Bank 10 9	8 7 6	<u>(5)</u> 4 3	2 1 0		
	Right Bank 10 9	8 7 6	5 4 3	2 1 0		
ELOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
FLOODPLAIN Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water		
	20 19 18 17 16	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0		
⁷ LOODPLAIN Encroach- 1ent	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		

			Sto	orm Water Outfalls	ΟΤ
WATERSHED/SUBSHE	»: Tucker		DATE: 7/1/0	ASSESSED BY:	KMB
SURVEY REACH ID: -	TB'03 :	FIME: 0: 00 ADA/PM	<b>Рното ID:</b> (Camera-P		(=
SITE ID (Condition-#): O	T- <u>01</u> ]	LAT 41. 48. 44	"LONG 72º 29 . 7	" LMK	GPS: (Unit ID)
	1				
BANK: LT ART Head FLOW: None Trickle	TYPE:	MATERIAL: Concrete XM PVC/Plastic Br Other:	/~	DIMENSIONS: Diameter: <u>15 (in</u> )	SUBMERGED:
Moderate Substantial Other:	Open channel	Concrete Eart	Parabolic y	Depth:(in) Width (Top):(in) " (Bottom):(in)	NOT APOSICABLE
CONDITION:	ODOR: XNC Gas Sewage	None	VEGGIE DENSITY:	PIPE BENTHIC GRO	ge 🗌 Green
Corrosion	Sulfide	Paint Other:	Excessive     Other:	POOL QUALITY:         Good         Odors         Suds         Algae         Other:	-
		ne Slight Cloudiness ne Sewage (toilet pa plastic bags) Dum	Cloudy Opaque Opaque per, etc.)	Orange     Red     O       (oil sheen)     C       Sedimentation	ther:
1 no	FION CANDIDA	<b>TE</b> Discharge investig	gation  Stream daylighting it  Other:	Local stream repair/	outfall stabilization
<i>If yes for daylighting:</i> Length of vegetative cove	r from outfall: _	ft Type of	existing vegetation:	Slope:	o
If yes for stormwater: Is stormwater currently co		Land Us Area ava	e description:		
SEVERITY: strong (circle #) strong	compared to the amount of normal flow in receiving di		mall discharge; flow mostly clear and c scharge has a color and/or odor, the ar scharge is very small compared to the w and any impact appears to be minor	mount of discharge; s stream's base of causing a	s not have dry weather staining; or appearance any erosion problems.
SKETCH/NOTES:	5	4	3	2	
SKETCH/NOTES:					
)			J	REPORTED TO AUTHORI	fies: 🗌 yes 🗌 no

				In	pacted B	uffer IB
WATERSHED/SUBSHED: TUcker			DATE:	7/1	108 AS	SSESSED BY: KMB
DRVEY REACH: TB 05	TIME: G	: 45 AM)PM		<b>D ID</b> : (Cam		/#
	the second se	LONG 72°29		•	K	GPS: (Unit ID)
		LONG <u>72° 29</u>				
	<u> </u>	LONG <u>[C   V[</u>	(	LIVI	<u> </u>	
IMPACTED BANK:     REASON INADEQUATE:       LT     RT     Both	Lack of			☐ Widesp	read invasive	plants
LAND USE: Private Institutional	Golf Cou	rse Park Ot	her Publi	ic		
(Facing downstream) LT Bank	Ľ			: Unk	nonh	
RT Bank 🖄 🗌		]				
DOMINANT Paved Bare grour		U				-
LAND COVER: LT Bank		<i>,</i>	۲ ۲			ATV trail
RT Bank	<u> </u>					•
INVASIVE PLANTS: None Rare		artial coverage		tensive cove	rage 🗌 un	lknown
STREAM SHADE PROVIDED? None 🕅 Par	rtial	Full WETL	ands Pr	esent? 🛛	No 🗌	Yes 🔲 Unknown
		<b>1</b>				
POTENTIAL RESTORATION CANDIDATE     Action Candidate       Image:		on []Greenway d	lesign []	€Natural re	generation L	Invasives removal
RESTORABLE AREA		Impacted area on put		Impacted are		Impacted area on private
LT BANK RT REFORES		where the riparian are not appear to be used			ate land that is d for a specific	land where road; building encroachment or other
Length (ft): POTENTIA ( <i>Circle</i> #)	AL:	specific purpose; pler	nty of	purpose; ava	lable area for	feature significantly limits
Vidth (ft):		area available for pla		planting adec		available area for planting
		5	4		3	2 1
POTENTIAL CONFLICTS WITH REFORESTATION Poor/unsafe access to site Existing impervious	⊂OVER □ Sev	despread invasive	plants s (deer b	Potential	contaminatio	on 🔲 Lack of sun
Notes:			3 (ucci, 0			
NOTES.						
)						
• <u>-</u>						

							Impacte	d Buffe	er	IB
WATERSHED/SUBSHED:	Tucker				DATE:	7/_	108	ASSES	SSED BY:	KMB
JRVEY REACH: TB				<u>: 29 Д</u> /рм	1		Camera-Pic	#)	/#Q	3,7
SITE ID: (Condition-#)	START LA	<u>, 41 ° 48</u>	<u>' .49 "</u> 1	LONG 72 ° 29	131	' I	LMK		GPS: (U	nit ID)
<u>IB-02</u>	END LA	.T	_''' I	LONG°	111	I	_MK			
IMPACTED BANK:	REASON INA		Recently		ner:		lespread inv	asive pla	nts	
LAND USE: (Facing downstream) LT Bar RT Bar	ık 🗌 ık 🕅	nstitutional	C			: Atv :	trail?			
DOMINANT LAND COVER: LT Bai RT Bai		Bare ground	d Turf/lav		Shrub/s			Other C: (2)		
INVASIVE PLANTS:	🗌 None	🗌 Rare	P	artial coverage	Ex Ex	tensive c	overage	🖉 unkno	wn	
STREAM SHADE PROVID	DED? 🗌 Non	e 🎗 Part	ial 🗌	Full WETL	ands Pr	RESENT?	Ϋ́Ω No	🗌 Yes	🗌 Unkı	nown
POTENTIAL RESTORATI	ON CANDIDA	TE Activ		ion 🔏 Greenway o	lesign [	] Natura	ıl regenerati	on 🗌 In	ivasives re	moval
RESTORABLE AREA Length (ft): <u>30</u> Width (ft): <u>20</u>	к RT	<b>REFOREST</b> <b>POTENTIAI</b> ( <i>Circle</i> #)		Impacted area on pu where the riparian ar not appear to be use specific purpose; ple area available for pla	ea does d for any nty of nting	public or presently purpose; planting	d area on eithe private land th used for a spe available area adequate	at is la ecific er for fe	npacted area nd where roa ncroachment ature signific vailable area	ad; building t or other cantly limits
<u>.</u>				5			θ	2		1
POTENTIAL CONFLICTS			over 🗌 Sev	despread invasive vere animal impact	plants s (deer, b	Poter Poter)	ntial contam	ination		of sun
Notes: 2 getim 5		Stream	PATH / aburdoved rog	international mapping						
) )			bank							
and the second s										

Impacted Bu	ffer
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IB

WATERSHED/SUBSHED: TUCKE	x		DATE: 7/ (/0)	8 ASSESSED BY: KMB
JRVEY REACH: TB03		1:22 ( PMPM	Рното ID: (Camera-F	ti i sermitin i sermitin i servici serv
	T 41 048 . 50"			GPS: (Unit ID)
IB-OI END LA		LONG°	' '' LMK	
LILT XIRT Both		f vegetation 🔀 To ly planted 🗌 Oth	o narrow 🔊 Widespread in ner:	nvasive plants
	nstitutional Golf Co		ther Public	
(Facing downstream) LT Bank			D: Forest	
RT Bank X DOMINANT Paved	Bare ground Turf/la		Shrub/scrub Trees	Other
LAND COVER: LT Bank				
RT Bank				
INVASIVE PLANTS:	/	Partial coverage	Extensive coverage	<b>X</b> )unknown
STREAM SHADE PROVIDED?	e 🔀 Partial [	Full WETL	ands Present? 🕅 No	Yes Unknown
POTENTIAL RESTORATION CANDIDA		tion Creenway	design 🗌 Natural regenera	
	Other:			
RESTORABLE AREA		Imposted eres on pu	blip land have also a set of	
LT BANK RT	REFORESTATION	Impacted area on pu where the riparian ar	rea does public or private land	that is land where road; building
Length (ft): <b>50</b>	<b>POTENTIAL:</b>	not appear to be use specific purpose; ple		
Width (ft): 20	(Circle #)	area available for pla		available area for planting
		5	4 3	2 1
POTENTIAL CONFLICTS WITH REFOR	ESTATION	videspread invasive	plants 🔲 Potential conta ts (deer, beaver) 🕅 Other	mination 🗌 Lack of sun
NOTES:				
_				
$\zeta$	1 1			
7				
5				
1 2 2	· /			
Private Yan	/			
	stream			
Price Price	3			
a a	21			
$\langle \rangle$				
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)				
and the second				

				S	evere Ba	ank Ero	sion	ER
WATERSHED/SUBS	SHED: Tucker			DATE: <u>7</u> / 1	108	ASSESS	ED BY:	KMR
SURVEY REACH:	TBOZ	TIME: 9 : 0	25 AMYPM	<b>РНОТО ID</b> (CAM	IERA-PIC#	t):	/#	
SITE ID: (Condition-	$= \frac{1}{START LAT}$	11048.51.	' LONG 12º 2	0	LMK		GPS: (1	Unit ID)
ER- <u>0</u>	END LAT	1 . 48.50.	' Long <u>72° 3</u>	7.12"	LMK			
Downcutting	Currently unknown	LOCATION: DIMENSIONS	Meander bend	RT Both ( <i>l</i> Straight section	Steep s	lope/valle		
Headcutting	🔯 Bank scour	Length (if no C Bank Ht		and/or RT_ <u>12</u>			n width	4
Aggrading	Slope failure			and/or RT		-	idth	· · · ·
Sed. deposition	Channelized		T	and/or RT		Wettec	l Width	<u>5</u> ft
LAND OWNERSHIP	Private 🗌 Public	C Unknown	LAND COVER	Forest F	ield/Ag [	Develo	oped:	
POTENTIAL RESTO	DRATION CANDIDATE	E: Grade	17	Bank stabilizatior	1			
THREAT TO PROP	ERTY/INFRASTRUCT	JRE: 🗌 No	Yes (Descrit	e): Shed				
EXISTING RIPARIA	N WIDTH:	□ ≤25 ft	⊠ 25 - 50 ft [	] 50-75ft  [] 75∙	-100ft [	>100ft		
EROSION SEVERITY(circle#) Channelized= 1	Active downcutting; tall ban of the stream eroding at a fa contributing significant amo stream; obvious threat to pr infrastructure.	ast rate; erosion unt of sediment to	Pat downcutting evide widening, banks activ moderate rate; no thr infrastructure	ely eroding at a	failure/eros	sion; likely ca	used by a	reas of bank pipe outfall, local n or adjacent use.
)	5	C	3		2		1	
ACCESS:	Good access: Open area in ownership, sufficient room t materials, easy stream char heavy equipment using exis trails.	o stockpile nnel access for		ccess requires tree andscaped areas. or distant from stream.	other sensi stockpile ar distance fro equipment	itive areas to reas availabl om stream se	access str le and/or lo	and, steep slope or eam. Minimal cated a great ecialized heavy
NOTES/CROSS SEC		4		)	2		1	
I 25 €		ections	Crussien Constitut	Stream rung	REPORTEI	D TO AUTH	IORITIES	YES 🗌 NO

Stream Crossing

		Parts			<b>n</b> +		L	
	100000	srk		DATE:	711108		SSED BY:	n <u>B</u>
1. Second to the Second to the Second	сн ID: 1603	TIME::	_AM/PM		D: (Camera-Pic		<u>/# \[ &lt;</u>	0
SITE ID: (Con	dition-#) SC- <u>O1</u> LAT	<u>41 · 48 · 4</u>	_ LONG	2º_19	<u>'8</u> " Li	ИК	GPS (Unit	( <i>ID</i> )
TYPE: 🗌 Roa	d Crossing 🔲 Railroad Crossi	ng 🕅 Manmade I	Dam 🔲 Beav	er Dam	Geological For	nation	Other:	
For Road/ Railroad Crossings	SHAPE: Arch Bottomless Box Elliptical Circular Other: CONDITION: (Evidence of)	# BARRELS:	MATERIAL: Concrete Metal Other:		GNMENT: Flow-aligned Not flow-aligned Do not know	Barrel diai	Height:	e, sketch) (ft) (ft)
ONLY	Cracking/chipping/corrosion	n 🗌 Downstrean				Roadway	Width:	(ft)
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re		-	replacement 🗌 l	Jpstream sto	orage retrofit	
IS SC ACTING	G AS GRADE CONTROL	□ No 🕅 Ye	es 🗌 Unk	nown				
	EXTENT OF PHYSICAL BLO	CKAGE:		BL	OCKAGE SEVER	RITY: (circl	'e #)	
If yes for fish barrier	<ul> <li>☐ Total ☐ Partial</li> <li>☐ Temporary ☐ Unknow</li> <li>CAUSE:</li> <li>☑ Drop too high Water Di</li> <li>☑ Flow too shallow Water D</li> <li>☐ Other:</li> </ul>	rop: <u>12</u> (in)	A structure such road culvert on a greater stream bl upstream mover anadromous fish, passage device p	3rd order or ocking the ient of no fish	A total fish blocka tributary that wou significant reach of or partial blockag interfere with the anadromous fish.	d isolate a of stream, e that may	A temporary barrie beaver dam or a b the very head of a very little viable fis above it; natural b as waterfalls.	lockage at stream with sh habitat
<u> </u>			5		4 3		2 (1	رز
NOTES/SKET	CH:	000 010 - 894	Cascad De De	Q VIder Æ C	rs Sinder blocks			
<b>)</b>								
Ĺ					REPOR	TED TO AUT	HORITIES 🗌 Y	es 🗌 No

Stream	Crossing

						Stre	am Cros	sing	SC
WATERSHED	SUBSHED: TUCKEr P	rk		DA	TE: 7	1 1 08	> Asse	SSED BY: K	MB
URVEY REA			AM/PM			: (Camera-Pie	c #)	/# <b>[</b> [	
SITE ID: (Con	dition-#) SC- <u>02</u> LAT	<u>41. 48. 41</u>	<u>4</u> " Lon	NG <u>72°</u>	<u> 29 :</u>	<u>7 "</u> L	мк	GPS (Uni	it ID)
TYPE: X Roa	nd Crossing 🔲 Railroad Crossin								<del></del>
For Road/ Railroad	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS: Single Double Triple Other:	MATERI	rete I					<u>(4</u> (ft) (ft)
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	Downstrean		e	Fla	ERT SLOPE: t ght (2° – 5 ⁰ ) vious (>5°)		width:	<u>+ (ft)</u> (ft) <u>(ft)</u>
									( )
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re		Culvert r Other:	epair/rep	blacement 🔲 I	Upstream st	orage retrofit	
IS SC ACTING	G AS GRADE CONTROL	X No Y	es 🗌	Unknow	n				
	EXTENT OF PHYSICAL BLO	CKAGE:			BLO	CKAGE SEVEI	RITY: (circ	le #)	
If yes for fish barrier	Total Partial Temporary Unknow CAUSE: Drop too high Water Dr Flow too shallow Water Dr Other:	op:(in)	road culver greater stre upstream m anadromou	such as a d t on a 3rd or eam blocking novement of us fish; no fis evice presen	rder or 9 the 5h t.	A total fish blocka tributary that wou significant reach or partial blockag interfere with the anadromous fish	Id isolate a of stream, le that may migration of	A temporary barn beaver dam or a the very head of very little viable fi above it; natural as waterfalls.	blockage at a stream with ish habitat barriers such
Norra(Syrr				5		4 3		2	1
NOTES/SKET	СН:		triam		PI	DEVIXS	T.		
						Repor	RTED TO AU	THORITIES 🔲	Yes 🗌 No

			Re	each Level As	sessment	RC
SURVEY REACH	ID: 18-04 W	TRSHD/SUBSHD:		DATE: 7/	Asse	SSED BY:
	16: <u>10:30</u> AM/PI	M LMK: 17 <u>°79'07</u> "	END TIME: [] LAT <u>U</u> ° <u>U</u> ' DESCRIPTION:		LMK: 120_19_10, z.c./Pzem	GI
RAIN IN LAST 24 HO	DURS 🗆 Heavy rain	•	PRESENT CONDITIONS	□ Heavy rain □ Trace	□ Steady rain □ Overcast	□ Intermitte
SURROUNDING LAN		al 🗌 Commercial urse 🗌 Park		Suburban/Res	□ Forested □ Other:	□ Institutior
Averagi	CONDITIONS (ch	eck applicable)		SKETCH AND SIT		
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	□ 50%-75% 🙀 75-100%	Simple planar sketch o within the survey rea features o	of survey reach. Tra ach (OT, ER, IB,SC, deemed appropriate.	UT, TR, MI) as w	ell as any additi
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty)	slick)	Cobble (2.5 –10") Boulder (>10") ed rock				
WATER CLARITY	aturally colored) 🛛					
AQUATIC PLANTS IN STREAM		ne □ some ⊠ lots e □ some □ lots		Pond.		
Wildlife in or Around Stream	(Evidence of) □ Fish ⊠ Beav □ Snails □ Othe		]			
STREAM SHADING (water surface)	₩ Mostly shaded □ Halfway (≥50% □ Partially shade □ Unshaded (< 2	∕₀) d (≥25% )		Beaver d	laun	
CHANNEL DYNAMICS	Downcutting Widening Headcutting Aggrading	Bed scour Bank failure Bank scour Slope failure				a
	L Sed. depositio	n Channelized $2$ (ft)	-	e san marine san	specie encro	
CHANNEL DIMENSIONS (FACING	RT bank Width: Bottom	$\frac{2}{3}$ (ft)			enwo m 4	stream
DOWNSTREAM)	Тор	<u>15</u> (ft)		and a second sec		
Ŗ	EACH ACCESSIBILI			and the second s	S. Same	
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using ovisition trade or trails	Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from	Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/or located a great distance from stream. Specialized heavy	byoon x Eg		-5C F/ TB03	599 <b>50449999948</b> 28095059777
existing roads or trails.	stream.	equipment required.	**************************************	nann na marainn an Santainn an Santainn 1990 an Santainn 1990 an Santainn an Santainn an Santainn 1990 an Santa	an a	1 - or $_{\rm Ham}$ is a second step ( $10^{-1}$ , $10^{-1}$
NOTES: (biggest prob	lem you see in survey	reach)	· ·····		······	<u> </u>

<u></u>	Optimal	Suboptimal	Marginal	Poor
N-STREAM HABITAT (May modify	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable bability and statute to allow full	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently	Less than 20% stable habitat; lac of habitat is obvious; substrate
criteria based on appropriate habitat regime)	stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	disturbed or removed.	unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	20 19 18 17 16	15 14 13 12 11 ALL BUFFER AND FLOODPLAN	10 9 8 7 6	5 4 3 2 1 0
	Optimal	Suboptimal		
Vegetated Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Marginal Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Poor Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetatior type is turf or crop land
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Encroach-	No evidence of floodplain encroachment in the form of fill material, land development, or	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on
MENT	20 19 18 17 16	15 14 (13) 12 11	effect on floodplain function	floodplain function

	1		F	Reach Level A	ssessment	R	CH
SURVEY REACH	D: TBOYB	WTRSHD/SUBSHD: TV	icker Brk	DATE: 1/	/08 Asse	SSED BY:	DRB -
1 1 1			$\begin{bmatrix} END & TIME: \\ LAT 4 0 48; \end{bmatrix}$	73" LONG ]	LMK:	2"	GPS ID:
RAIN IN LAST 24 HO			PRESENT CONDITIONS		gins		· · · · · · · · · · · · · · · · · · ·
None	□ Intermitt	ent 🗆 Trace	□ Clear	$\Box$ Trace	□ Steady rain □ Overcast	D Intern	
SURROUNDING LAN		rial	□ Urban/Residential □ Crop	Suburban/Res	□ Forested □ Other:	🗆 Institu	
AVERAGI	E CONDITIONS (c	heck applicable)	REACH	SKETCH AND SI		ACKING	
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% ⊠25-50 %	□ 50%-75% □ 75-100%	Simple planar sketch within the survey re	of survey reach. Tra each (OT, ER, IB,SC.	ck locations and II UT. TR. MI) as we	Ds for all si	te impacts Iditional
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5	slick)	Cobble (2.5 –10") Boulder (>10") Bed rock	Jeatures	deemed appropriate.	Indicate direction	1 of flow	
Stained (clear, no. 1) Other (chemicals,	aturally colored) [	oid (suspended matter) ∃ Opaque (milky)					
Aquatic Plants in Stream		ne □ some ⊠ lots ne ⊠ some □ lots					
Wildlife in or Around Stream	(Evidence of) □ Fish X Bea □ Snails □ Oth	ver 🗆 Deer					
STREAM SHADING (water surface)	☐ Mostly shaded A Halfway (≥50 ☐ Partially shad ☐ Unshaded (<2	ed (≥25%)		1 [House]			
Channel Dynamics	Downcutting Widening Headcutting	Bank failure Bank scour	LAND +				
Unknown	Aggrading Sed. deposition	on Slope failure		certioned contenents in vasives			
CHANNEL DIMENSIONS (FACING	Height: LT bank RT bank	(ft)	Mater	and the second se			
DOWNSTREAM)	Width: Bottom Top	$-\frac{\mathscr{G}}{17}$ (ft)	1 13	OT OL SK	etland)		
RI	EACH ACCESSIBIL	(ft)	L Bla	DI C	wa		
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for beavy	Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas.	Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/or located a great	Land Land	Roaver 1			
existing roads or trails.		distance from stream. Specialized heavy equipment required. 2 1		bearer pord			
NOTES: (biggest proble					······································		
1422118	c species	covering st	RAM				
		1		Reporte	D TO AUTHORIT		

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\	Optimal	Suboptimal	Marginal	Poor
IN-STREAM HABITAT (May modify criteria based on appropriate	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lacl of habitat is obvious; substrate unstable or lacking.
habitat regime)	that are not new fall and not transient).	rate at high end of scale).		
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 G	5 4 3	2 1 0
	Right Bank 10 9	8 7 G	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.
	Left Bank 10 9	<u>XQ</u> 7 G	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	20 19 18 17 16	15 14 3 12 11	10 9 8 7 6	5 4 3 2 1 0
	Over	ALL BUFFER AND FLOODPLA	N CONDITION	
	Optimal	Suboptimal	Marginal	Poor
Vegetated Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land
	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function
	20 19 18 17 16	15 14 13 (2) 11	10 9 8 7 6	5 4 3 2 1 0

WATERSHED/SUBSHEI	: TACKEI	(	DATE: ] / ( / C	ASSESSED BY:	LMB, DRB
SURVEY REACH ID: 7	BOYR TI	ME: 11: 06 AM/PM	Рното ID: (Camera-P		
SITE ID (Condition-#): O	and a state of the	141048.44 "La			GPS: (Unit ID)
D					· · · · · · · · · · · · · · · · · · ·
BANK: LT RT Head FLOW: None Trickle	TYPE:	MATERIAL: Concrete Metal PVC/Plastic Brick Other:	SHAPE: X Single X Circular Double Elliptical Triple Other:		SUBMERGED:
X Moderate Substantial Other:	Dpen channel	Concrete Earthen Other:	Parabolic V	Depth: <u>(in)</u> Width (Top): <u>(in)</u> " (Bottom): <u>(in)</u>	NOT APPEICABLE
CONDITION:	<b>ODOR:</b> NO Gas Sewage	DEPOSITS/STAINS:	VEGGIE DENSITY:	PIPE BENTHIC GR	<b>OWTH:</b> X None lge Green
Peeling Paint Corrosion Other:	Rancid/Sour	☐ Flow Line ☐ Paint ☐Other:	☐ Inhibited ☐ Excessive ☐ Other:	POOL QUALITY:	Colors Oils
	and the second second second second second	e Slight Cloudiness E Sewage (toilet paper, e astic bags) Dumping	Cloudy     Opaque       etc.)     Petroleum       (bulk)     Excessive	Orange Red C C (oil sheen)	Other:
FLOWING ONLY     TURBIDI FLOATA       OTHER     Exce       CONCERNS:     Need	TY: Non BLES: Non ss Trash (paper/pla s Regular Mainter	e Slight Cloudiness e Sewage (toilet paper, e astic bags) Dumping lance A Bank Ero	Cloudy       Opaque         etc.)       Petroleum         g (bulk)       Excessive         sion       Other:         n       Stream daylighting	(oil sheen)	Dther:
FLOWING ONLY     TURBIDI FLOATA       OTHER     Exce       CONCERNS:     Need       POTENTIAL RESTORAT       no	TY: Non BLES: Non ss Trash (paper/pla s Regular Mainter	e Slight Cloudiness E Sewage (toilet paper, e astic bags) Dumping nance A Bank Ero	Cloudy       Opaque         etc.)       Petroleum         (bulk)       Excessive         sion       Other:	(oil sheen)	Dther:
FLOWING ONLY     TURBIDI FLOATA       OTHER     Exce       CONCERNS:     X Need       POTENTIAL RESTORAT       no       f yes for daylighting:	TY: Non BLES: Non ss Trash (paper/pla s Regular Mainter TON CANDIDATI	e Slight Cloudiness e Sewage (toilet paper, e astic bags) Dumping lance A Bank Ero	Cloudy       Opaque         etc.)       Petroleum         (bulk)       Excessive         sion       Other:         n       Stream daylighting         Other:       Other:	(oil sheen)	Other:
FLOWING ONLY     TURBIDI FLOATA       OTHER     Exce       CONCERNS:     Need       POTENTIAL RESTORAT       no       f yes for daylighting:       Length of vegetative cove       f yes for stormwater:       s stormwater currently co	TY: Z Non BLES: Z Non ss Trash (paper/pla s Regular Mainter TION CANDIDATI	e Slight Cloudiness e Sewage (toilet paper, e astic bags) Dumping nance Sank Ero Discharge investigation Storm water retrofit	Cloudy       Opaque         etc.)       Petroleum         (bulk)       Excessive         sion       Other:         n       Stream daylighting         Other:       Image: Compare the second seco	(oil sheen) [] ( Sedimentation A Local stream repair/	Other:
FLOWING ONLY     TURBIDI FLOATA       OTHER     Exce       CONCERNS:     Need       POTENTIAL RESTORAT       no       f yes for daylighting:       Length of vegetative cove       f yes for stormwater:       s stormwater currently co       Yes     No i	TY: Z Non BLES: Z Non ss Trash (paper/pla s Regular Mainter TION CANDIDATI r from outfall: ntrolled?	e Slight Cloudiness e Sewage (toilet paper, e astic bags) Dumping hance Sank Ero Discharge investigation Storm water retrofit ft Type of exist Land Use des Area available	Cloudy Opaque ctc.) Petroleum (bulk) Excessive sion Other:  n Stream daylighting Other:  ing vegetation: ccription:	(oil sheen) [] ( Sedimentation A Local stream repair/	Other:
FLOWING ONLY     TURBIDI FLOATA       OTHER     Exce       CONCERNS:     X Need       POTENTIAL RESTORAT     X Need       Ino     Image: Second Stress       If yes for daylighting:     Image: Second Stress       Length of vegetative cove     Image: Second Stress       If yes for stormwater:     Image: Second Stress       Image: Second Stress     Image: Second Stress       Image: Second Stress     Image: Second Stress       Image: Second Stress     Image: Stress	TY: ANON BLES: ANON SS Trash (paper/pla s Regular Mainter TION CANDIDATI TION CANDIDATI r from outfall: ntrolled? nvestigated y discharge with a dist g smell. The amount of m; discharge appears ficant impact downstre	e Slight Cloudiness e Sewage (toilet paper, e astic bags) Dumping hance M Bank Ero Discharge investigation Storm water retrofit ft Type of exist Land Use des Area available inct color and/or a f discharge is significant normal flow in receiving to be having a	Cloudy Opaque ctc.) Petroleum (bulk) Excessive sion Other:  n Stream daylighting Other:  ing vegetation: ccription:	(oil sheen)       0         Sedimentation       0         Image: Constraint of the nount of stream's base       0         Outfall doe: discharge; stream's base       0	Other:
FLOWING ONLY     TURBIDI FLOATA       OTHER     Exce       CONCERNS:     Need       POTENTIAL RESTORAT     Implementation       Ino     fyes for daylighting:       Length of vegetative cove       f yes for stormwater:       s stormwater currently co       Yes No     Not i       DUTFALL     Heat       Severity:     complete       circle #)     signition	TY: A Non BLES: A Non ss Trash (paper/pla s Regular Mainter TION CANDIDATI TION CANDIDATI r from outfall: nvestigated ry discharge with a dist g smell. The amount of m; discharge appears	e Slight Cloudiness e Sewage (toilet paper, e astic bags) Dumping hance M Bank Ero Discharge investigation Storm water retrofit ft Type of exist Land Use des Area available inct color and/or a f discharge is significant normal flow in receiving to be having a	Cloudy Opaque C	(oil sheen)       0         Sedimentation       0         Image: Constraint of the nount of stream's base       0         Outfall doe: discharge; stream's base       0	Other:
FLOWING ONLY       TURBIDI FLOATA         OTHER       Exce         CONCERNS:       Need         POTENTIAL RESTORAT       Ino         Ino       Ino         f yes for daylighting:       Length of vegetative cove         f yes for stormwater:       stormwater:         s stormwater currently co       Yes No       Not i         OUTFALL       Heave         Severity:       composition         circle #)       strom         SKETCH/NOTES:       Stromy	TY: Solution of the answer of	e Slight Cloudiness e Sewage (toilet paper, e astic bags) Dumping hance S Bank Ero Discharge investigation Storm water retrofit ft Type of exist Land Use des Area available inct color and/or a f discharge is significant normal flow in receiving to be having a am. Slight Cloudiness Dumping Bank Ero Sank Ero Small di discharge fw and Small di discharge fw and Small di discharge Storm water Small di discharge Small di discharge Small di discharge fw and Discharge Small di discharge Small di discharge Small di discharge Small di discharge fw and A	Cloudy       Opaque         etc.)       Petroleum         (bulk)       Excessive         sion       Other:         n       Stream daylighting	(oil sheen)       0         Sedimentation         Image: Sedimentation <td>Other:</td>	Other:
FLOWING ONLY       TURBIDI FLOATA         OTHER       Exce         CONCERNS:       Need         POTENTIAL RESTORAT       Image: Concernstructure         Ino       Image: Concerns         POTENTIAL RESTORAT       Image: Concerns         Ino       Image: Concerns         Image: Concerns       Image: Conc	TY: Solution of the answer of	e Slight Cloudiness e Sewage (toilet paper, of astic bags) Dumping tance Sank Ero Discharge investigation Storm water retrofit ft Type of exist Land Use des Area available inct color and/or a f discharge is significant normal flow in receiving to be having a am.	Cloudy       Opaque         etc.)       Petroleum         (bulk)       Excessive         sion       Other:         n       Stream daylighting	(oil sheen)       0         Sedimentation         Image: Sedimentation <td>Other:</td>	Other:

Trash and Debris

a an

WATERSHED/SUB	sshed: Tucker		DATE: <u>7</u> /	1/08	ASSESSED BY: KMB DRB
URVEY REACH I	D: TBOYB TI	ме: <u>  :02</u> АД/рм	Рното ID: (Ca	mera-Pic #)	1# 20
SITE ID: (Condition	-#) <u>TR-<u>θ</u> LAT<u>Ψ</u>.</u>	<u>48.44</u> "LON	072029.3	_" LMK	GPS: (Unit ID)
TYPE: Industrial Commercial Residential	MATERIAL:         Plastic       Paper         Tires       Constr         Appliances       Yard V         Automotive       Other:		SOURCE: Unknown Flooding Illegal dump Local outfall	LOCATION:	• • • • • • • • • • • • •
POTENTIAL REST	ORATION CANDIDATE	tream cleanup 🔲 Stre Dther:	am adoption segment	Removal/pr	evention of dumping
If yes for trash or debris removal		Heavy equipment 🕅 T			DUMPSTER WITHIN 100 FT:
CLEAN-UP POTENTIAL: (Circle #)	A small amount of trash (i.e., less than two pickup truck loads) located inside a park with easy access	A large amount of trash, of with easy access. Trash in a long period of time but few days, possibly with a s	may have been dumped or it could be cleaned up ir	y have been dumped over could be cleaned up in a	
· /	(5)	4	3	2	1
NOTES: grag	os and brush clip	pings			
				REPORTEI	TO AUTHORITIES VES VINO

TR

	Reach Level Assessment RCH
SURVEY REACH ID: 13-04C WTRSHD/SUBSHD: TO START TIME: 11: 30 AM/PM LMK:	LATE:     DATE:     DATE:     ASSESSED BY:       END     TIME:
LAT 410 48.43" LONG 72029 100"	LAT' LONG' '''
DESCRIPTION: Bodayor D	DESCRIPTION:
RAIN IN LAST 24 HOURS   Heavy rain   Steady rain     None   Intermittent   Trace	PRESENT CONDITIONS       □       Heavy rain       □       Steady rain       □       Intermittent         Clear       □       Trace       □       Overcast       ☑       Partly cloudy
SURROUNDING LAND USE:  Golf course  Park	Urban/Residential Suburban/Res Forested Institutional
AVERAGE CONDITIONS (check applicable)	REACH SKETCH AND SITE IMPACT TRACKING
BASE FLOW AS %         □ 0-25%         □ 50%-75%           CHANNEL WIDTH         □ 25-50 %         □ 75-100%	Simple planar sketch of survey reach. Track locations and IDs for all site impacts within the survey reach (OT, ER, IB,SC, UT, TR, MI) as well as any additional fortunes downed appropriate leading for the survey of the survey in the survey of the survey
DOMINANT SUBSTRATE         Silt/clay (fine or slick)       Cobble (2.5 -10")         Sand (gritty)       Boulder (>10")         Gravel (0.1-2.5")       Bed rock	features deemed appropriate. Indicate direction of flow
WATER CLARITY Clear Turbid (suspended matter) Stained (clear, naturally colored) Opaque (milky) Other (chemicals, dyes)	SMTUC
AQUATIC PLANTSAttached:nonesomelotsIN STREAMFloating:nonesomelots	77213-7
WILDLIFE IN OR       (Evidence of)         AROUND STREAM       IFish       Beaver       Deer         AROUND STREAM       Snails       Other:	OF-R. A
STREAM SHADING (water surface) $\Box$ Mostly shaded ( $\geq$ 75% coverage) $\Box$ Halfway ( $\geq$ 50%) $\Box$ Partially shaded ( $\geq$ 25%) $\Box$ Unshaded (<25%)	
CHANNEL     Downcutting     Bed scour       DYNAMICS     Widening     Bank failure       Headcutting     Bank scour	A LI (SF-
Unknown Aggrading Slope failure Sed. deposition Channelized	(scol 18.01 / 18.01
CHANNELHeight: LT bank(ft)DIMENSIONSRT bank(ft)	
(FACING Width: Bottom(ft)	
Top(ft)	Fry / / / tra
REACH ACCESSIBILITY         Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.       Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.         5       4       3       2       I	VOUDTA STATE
NOTES: (biggest problem you see in survey reach)	Α.
)	
	<b>Reported to authorities</b> Yes No

	Optimal	Suboptimal	Marginal	Poor
N-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetatior has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to property or infrastructure.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfuil) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	and a second	ALL BUFFER AND FLOODPLA		
	Optimal	Suboptimal	Marginal	Poor
Vegetated Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: little or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN Vegetation	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetation type is turf or crop land
n in i	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

				Storm Water	· Outfalls	ΟΤ
WATERSHED/SUBS	HED: Tuck	er	DATE: 7 /	1 108 Asse	SSED BY: (C	MB
SURVEY REACH ID	-TBOYC	TIME: 2:08 AM	<b>Рното ID:</b> (С	amera-Pic #)	/#	
SITE ID (Condition-#)	от- <u>04</u>	LAT 41 . 48 . 4-	<u>3 "LONG 72° 28</u>	<u>'5["</u> LMK	GI	<b>PS:</b> (Unit ID)
BANK: LT RT Hea FLOW: None Trick	Closed	MATERIAL:	Metal 🛛 Circular 🛛		01,	SUBMERGED: X No Partially Fully
Moderate Substantial	Dpen channel	Concrete E	arthen Parabolic Other:	Depth: _ Width (Top):_ " (Bottom):_		NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: MN Gas Sewage Rancid/Sou Sulfide Other:	X None □Oily	S: VEGGIE DENS None Normal Inhibited Excessive Other:	Brown Other: POOL QU Good	VALITY: Orange OALITY: ORALITY: ORALITY	Green
OTHER CONCERNS: N		/plastic bags) D ntenance B	paper, etc.) Pe numping (bulk) E ank Erosion O stigation Stream dayli	paque etroleum (oil sheen) excessive Sedimentation ther: ghting Local stro		
Length of vegetative c         If yes for stormwater         Is stormwater currently         Yes       No         No       N	over from outfall: r: y controlled?	Land	of existing vegetation: Use description: available:		Slope:	0
SEVERITY: (circle #)	compared to the amoun stream; discharge appe significant impact downs	nt of discharge is significant it of normal flow in receiving ars to be having a	Small discharge; flow mostly of discharge has a color and/or o discharge is very small compa flow and any impact appears to 3	dor, the amount of red to the stream's base o be minor / localized.	discharge; staini	have dry weather ng; or appearance rosion problems.
SKETCH/NOTES:	ppt					1
) 				REPORTED TO	O AUTHORITIES	: 🗌 yes 🗌 no

				Stor	m Water Ou	Itfalls <b>OT</b>		
WATERSHED/SUBSHED:	. Jucker			DATE: 71118 ASSESSED BY: 4M8				
SURVEY REACH ID: 1		ГІМЕ: <u>12: 46</u> АМ/РА		PHOTO ID: (Camera-Pie		/#		
SITE ID (Condition-#): OT	- <u>05</u>  1	LAT <u>47 ° 48 ' 48</u>	<u>4</u> " Lon 7	NG 720 28 .46 "	LMK	<b>GPS:</b> (Unit ID)		
BANK: LT RT Head FLOW: None Trickle	TYPE: TClosed pipe	MATERIAL:	/letal / Brick /	SHAPE: X Single Circular Double Elliptical Triple Other:	DIMENSION	$\rightarrow$ $\lambda_{\rm No}$		
Moderate Substantial Other:	Open channel	Concrete Ear	then	Parabolic W	epth: 'idth (Top): (Bottom):	(in) NOT APPEICABLE (in)		
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR! NC Gas Sewage Rancid/Sou Sulfide Other:	in None ☐Oily		VEGGIE DENSITY: None Normal Inhibited Excessive Other:	Brown Conternation Dependence Pool QUALI	C GROWTH: None Orange Green TY: M No pool dors Colors Oils Algae Floatables		
CONCERNS: Needs	BLES: DATE: No s Trash (paper/j s Regular Maint	one Slight Cloudines Sewage (toilet p plastic bags) Dur enance Ban	aper, etc mping (l 1k Erosi	Cloudy     Opaque       2.)     Petroleum (       bulk)     Excessive S       on     Other:	Sedimentation	Other:		
POTENTIAL RESTORATI	ION CANDIDA	Storm water retro		Other:	_ Local stream	repair/outfall stabilization		
If yes for daylighting: Length of vegetative cover If yes for stormwater: Is stormwater currently con Yes No Not in		ft Type of Land U	f existin	g vegetation:	S	Slope:°		
OUTFALL Heavy SEVERITY: strong (circle #) stream	y discharge with a d g smell. The amoun ared to the amount n; discharge appea cant impact downst	of normal flow in receiving rs to be having a ream.	Small disc discharge discharge	charge; flow mostly clear and od has a color and/or odor, the am is very small compared to the st my impact appears to be minor /	ount of disc	tfall does not have dry weather charge; staining; or appearance ausing any erosion problems.		
	5	4		3	2	(V)		
SKETCH/NOTES:				R	EPORTED TO AU	THORITIES: 🗌 YES 🗌 NO		

WATERSHED/SUBSHEI	: Tucher	Brock	DATE: 7/ 1/08	ASSESSED BY: 73
SURVEY REACH ID: 7		ME:11:45 (M)PM	Рното ID: (Camera-Pic	
SITE ID (Condition-#): O		The second se	LONG 11 ° 28 · 55 "	
BANK: LT RT Head FLOW: None Trickle	TYPE: Closed pipe	MATERIAL: Concrete Meta PVC/Plastic Brick Other:		DIMENSIONS: SUBMERGED: Diameter: 4 (in) Partially
Moderate Substantial Other:	□ Open channel	Concrete Earthe Other:	Parabolic Wi	ppth: <u>(in)</u> idth (Top): <u>(in)</u> (Bottom): <u>(in)</u>
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: NO Gas Sewage Rancid/Sour Sulfide Other:	DEPOSITS/STAINS: None Oily Flow Line Paint Other:	VEGGIE DENSITY: None Normal Inhibited Excessive Other:	PIPE BENTHIC GROWTH: None         Brown       Orange         Other:         POOL QUALITY:       No pool         Good       Odors       Colors         Suds       Algae       Floatables         Other:       Other:       Dils
ONLY FLOATA	BLES: None	e 🗌 Sewage (toilet pape	Cloudy Opaque	oil sheen)
OTHER Exce CONCERNS: Need POTENTIAL RESTORAT	ss Trash (paper/pla ls Regular Mainten	ance 🗌 Bank E	r, etc.) Petroleum (o ng (bulk) Excessive S crosion Other: cion Stream daylighting	Local stream repair/outfall stabilization
OTHER Exce CONCERNS: Exce POTENTIAL RESTORAT no If yes for daylighting:	ss Trash (paper/pla ls Regular Mainten FION CANDIDATE	ance Dumpi Dumpi Bank E Discharge investigat	r, etc.) Petroleum (a ng (bulk) Excessive S crosion Other: ion Stream daylighting C Other: Ryboo R	Sedimentation
OTHER Exce CONCERNS: Exce POTENTIAL RESTORAT no If yes for daylighting: Length of vegetative cove	ss Trash (paper/pla ls Regular Mainten TION CANDIDATE r from outfall:	Istic bags)	r, etc.) Petroleum (a ng (bulk) Excessive S crosion Other: ion Stream daylighting Other: Ryhaw Ra isting vegetation:	Decimentation Local stream repair/outfall stabilization of beaders of variages decimation
OTHER       Exce         CONCERNS:       Need         POTENTIAL RESTORAT         no         If yes for daylighting:         Length of vegetative cove         If yes for stormwater:         Is stormwater currently co         Yes         No         OUTFALL         SEVERITY:         (circle #)	ss Trash (paper/pla ls Regular Mainten TION CANDIDATE TION CANDIDATE r from outfall: ontrolled? investigated vy discharge with a disti ng smell. The amount of pared to the amount of pared to the amount of pared to the amount of pared to the amount of pared to the amount of pared to the amoun	Istic bags) ance Dumpi Bank E Bank E Discharge investigat Storm water retrofit ft Type of ex Land Use of Area availa inct color and/or a f discharge is significant normal flow in receiving am.	t, etc.)       Petroleum (display="block")         ng (bulk)       Excessive S         crosion       Other:         cion       Stream daylighting         ion       Stream daylighting         Other:       Petroleum (display="block")         isting vegetation:       Idischarge; flow mostly clear and odd rarge has a color and/or odor, the amoral rarge is very small compared to the strand any impact appears to be minor / line	Declimentation Declimentatio Declimentation Declimentation Declimentation Declime
OTHER       Exce         CONCERNS:       Need         POTENTIAL RESTORAT       no         If yes for daylighting:       Need         Length of vegetative cove       If yes for stormwater:         Is stormwater currently cc       Yes No       Not if         OUTFALL       Heat       Store         SEVERITY:       com       streation         (circle #)       streation       streation	ss Trash (paper/pla ls Regular Mainten FION CANDIDATE r from outfall: investigated vy discharge with a disti pared to the amount of pared to the amount of f am; discharge appears t	Istic bags) Dumpi ance Dumpi Bank E Discharge investigat Storm water retrofit ft Type of ex Land Use of Area availa inct color and/or a f discharge is significant normal flow in receiving to be having a	r, etc.)       Petroleum (discharge; flow mostly clear and oddinarge is very small compared to the str	Declimentation Declimentatio Declimentation Declimentation Declimentation Declime
OTHER       Exce         CONCERNS:       Need         POTENTIAL RESTORAT       Ino         If yes for daylighting:       Length of vegetative cove         If yes for stormwater:       Is stormwater currently co         Yes       No       Not if         OUTFALL       Heat         SEVERITY:       com         (circle #)       streat	ss Trash (paper/pla ls Regular Mainten TION CANDIDATE TION CANDIDATE r from outfall: ontrolled? investigated vy discharge with a disti ng smell. The amount of pared to the amount of pared to the amount of pared to the amount of pared to the amount of pared to the amount of pared to the amoun	Istic bags) ance Dumpi Bank E Bank E Discharge investigat Storm water retrofit ft Type of ex Land Use of Area availa inct color and/or a f discharge is significant normal flow in receiving am.	t, etc.)       Petroleum (display="block")         ng (bulk)       Excessive S         crosion       Other:         cion       Stream daylighting         ion       Stream daylighting         Other:       Petroleum (display="block")         isting vegetation:       Idischarge; flow mostly clear and odd rarge has a color and/or odor, the amoral rarge is very small compared to the strand any impact appears to be minor / line	Gedimentation         Local stream repair/outfall stabilization         Slope:

Storm Water Outfalls

	<i>i</i>			1			
WATERSHED/SUBSHE	100000		DATE: <u>7 / / / 0</u>		MB		
SURVEY REACH ID:		ле: <u>[1:55</u> аЮ/рм	Рното ID: (Camera-Pic #) /# 27				
SITE ID (Condition-#): O	T- <u>05</u> LA	т <u>41°48 · 43</u> "L	ONG 72028 .52 "		GPS: (Unit ID)		
		· · · · · · · · · · · · · · · · · · ·	······································	······································			
BANK:	Түре:	MATERIAL:	SHAPE: Single	DIMENSIONS:	SUBMERGED:		
	Closed	Concrete Metal	Circular Double	Diameter: <u> </u>	No No		
FLOW:	pipe	Other:	Other:		Partially		
Moderate							
Substantial	Dpen .	Concrete Earthen		epth: (in)	NOT APPEICABLE		
Other:	channel	Other:		idth (Top): <u>(in)</u> (Bottom): <u>(in)</u>	NOT APPENCABLE		
CONDITION:	ODOR: NO	DEPOSITS/STAINS:	VEGGIE DENSITY:	PIPE BENTHIC GROV	VTH. St. Nono		
None None	□Gas	None	None	Brown Orange			
Chip/Cracked		□Oily □ Flow Line	Normal	Other:	<b></b>		
Peeling Paint Corrosion	Rancid/Sour	Paint	☐ Inhibited ☐ Excessive	POOL QUALITY: 1	No pool		
Other:	Other:	Other:	Other:	Good Odors			
	_			Suds Algae Other:	Floatables		
FOR COLOR: FLOWING TURBID				Orange 🗌 Red 🗌 Oth	ier:		
ONLY FLOATA			Cloudy Opaque etc.) Petroleum (				
	ess Trash (paper/plas				ier		
	ds Regular Maintena			Seamentation			
)				-			
POTENTIAL RESTORA	FION CANDIDATE	Discharge investigation	on 🗌 Stream daylighting [	Local stream repair/ou	tfall stabilization		
X no		Storm water retrofit	Other:				
If yes for daylighting:							
Length of vegetative cove	er from outfall:	ft Type of exis	ting vegetation:	Slope:	°		
If yes for stormwater:							
Is stormwater currently co	ontrolled?	Land Use de	scription				
Yes No Not		Area availab					
OUTFALL Hea	vy discharge with a distir	nct color and/or a					
	ng smell. The amount of pared to the amount of n	discharge is significant dischar	lischarge; flow mostly clear and od ge has a color and/or odor, the amo	ount of Outfall does n	ot have dry weather		
(circle #) stre	am; discharge appears to	be having a dischar	ge is very small compared to the st d any impact appears to be minor /	realit's base of coucing on	ining; or appearance / erosion problems.		
sign	ificant impact downstream 5						
SKETCH/NOTES:		4	3	2			
SKETCHITOTES.							
5							
)			R	EPORTED TO AUTHORITI	ES: YES NO		

## IB

6 A	
WATERSHED/SUBSHED: TAckaR	<b>DATE:</b> $1/2/29$ Assessed by: $4MS$
JRVEY REACH: TBOY C TIME: 2: 40	
SITE D: (Condition-#) START LAT <u>41 ° 48 '47 " LONG</u>	
IB-0 END LAT <u>41 ° 48' 44</u> " LONG	17_ <u>° 28' 55''</u> LMK
LT IRT Both Recently planted	ion Too narrow Widespread invasive plants
	ark Other Public
(Facing downstream) LT Bank	
RT Bank     Image: Constraint of the second se	Image: Contract of the second seco
LAND COVER: LT Bank	Tall grass   Shrub/scrub   Trees   Other     Image: I
RT Bank	
INVASIVE PLANTS: None Rare Partial co	
STREAM SHADE PROVIDED? None X Partial Full	WETLANDS PRESENT? A No Yes Unknown
	WEILANDSTRESENT: KINO LIYES LIUNKNOWN
POTENTIAL RESTORATION CANDIDATE       Active reforestation         no       Other:	Greenway design 🔯 Natural regeneration 🔀 Invasives removal
	d area on public land
IT BANK BT REFORESTATION where the	d area on public land Impacted area on either Impacted area on private land that is Ind where road; building
Length (ft): POTENTIAL: not app	ear to be used for any presently used for a specific encroachment or other purpose; plenty of purpose; available area for feature significantly limits
	ailable for planting planting adequate available area for planting
	5 4 3 2 1
POTENTIAL CONFLICTS WITH REFORESTATION       Widesprea         Poor/unsafe access to site       Existing impervious cover         Severe anim	d invasive plants
NOTES:	/p
<u></u>	

				Impacte	d Buffer	IB
WATERSHED/SUBSHED:			DATE: _	71 1 108	ASSESSED	BY: DIZIS
JIRVEY REACH: TR-040		2:15AM/PM		<b>.</b> <b>D:</b> (Camera-Pic		/#
SITE ID: (Condition-#) START LA	T 41 0 48.41 "	LONG <u>72°28</u>	1 30 "	LMK	GPS	(Unit ID)
		LONG 17 ° 24		LMK		
						,
IMPACTED/BANK:     REASON INA       LT     ART     Both	ADEQUATE: Lack of			] Widespread inva	asive plants	
. /	nstitutional Golf Cou	irse Park Otl	her Public			
(Facing downstream) LT Bank			: []			
RT Bank						
<b>DOMINANT</b> Paved LAND COVER: LT Bank	Bare ground Turf/lav	wn Tall grass	Shrub/scru	ib Trees	Other	
LAND COVER: LT Bank			ЪД М			
INVASIVE PLANTS: None					<u>:</u>	
		Partial coverage			unknown	
STREAM SHADE PROVIDED? Non	e 🗌 Partial 🗌	Full WETLA	ANDS PRES	SENT? No	Yes 🗌	Unknown
POTENTIAL RESTORATION CANDIDA	TE Active reforestat	ion 🔲 Greenway de	esign 🔠	Natural regeneration	on 🔲 Invasiv	es removal
RESTORABLE AREA		Impacted area on pub	lic land lr	mpacted area on either	r Imposto	t area an nrivata
LT BANK <u>R</u> T	REFORESTATION	where the riparian are	adoes p	oublic or private land the	at is land whe	l area on private ere road; building
Length (ft): $\underline{\mathcal{M}}$	POTENTIAL:	not appear to be used specific purpose; plen		resently used for a spe purpose; available area		nment or other ignificantly limits
Width (ft): <u>70</u> 400	(Circle #)	area available for plan		lanting adequate		area for planting
		5	4	2 3	2	1
POTENTIAL CONFLICTS WITH REFOR		despread invasive p vere animal impacts	olants 🔲 s (deer, bea	Potential contami ver) Dother:	ination 🔲 L	ack of sun
		SERVE	分 多			m.

			Stor	rm Water Outfalls	ΟΤ
WATERSHED/SUBSHE	o: tucke	RBrK	DATE: 1 / 0	8 ASSESSED BY: KA	18 DRR
SURVEY REACH ID: 1		ME: 11: 38 AG/PM	PHOTO ID: (Camera-Pi		0 1-15
SITE ID (Condition-#): C			ONG 72. 28 .57		<b>PS:</b> (Unit ID)
BANK: LT RT Head FLOW: Mone Trickle Moderate Substantial Other:	TYPE: Closed pipe	MATERIAL: Concrete Metal VC/Plastic Brick Other: Concrete Earthen Other:	Elliptical      Triple     Other:     Trapezoid      Parabolic      W	Diameter: <u>(in)</u>	SUBMERGED: No Partially Fully NOT APPENCABLE
CONDITION:	ODOR: X NO Gas Sewage Rancid/Sour	<b>DEPOSITS/STAINS:</b> Thone Oily Flow Line	VEGGIE DENSITY: (None Normal Inhibited	" (Bottom): (in)         PIPE BENTHIC GROW         Brown       Orange         Other:         POOL QUALITY: X 1	Ø Green
Corrosion Other:	Sulfide	☐ Paint ☐Other:	Excessive     Other:	Good Odors C Suds Algae F Other:	Colors 🗌 Oils
	orry: None	<ul> <li>Slight Cloudiness</li> <li>Sewage (toilet paper, stic bags)</li> </ul>	Cloudy Opaque etc.) Petroleum ( g (bulk) Excessive	Orange Red Other	
1 no	TION CANDIDATE	<ul> <li>Discharge investigati</li> <li>Storm water retrofit</li> </ul>	on  Stream daylighting Other:	Local stream repair/outf	fall stabilization
<i>If yes for daylighting:</i> Length of vegetative cove	er from outfall:	ft Type of exis	sting vegetation:	Slope:	o ~,
If yes for stormwater: Is stormwater currently c ☐ Yes ☐ No ☐ Not		Land Use de Area availab			
SEVERITY: stro (circle #) stre	avy discharge with a dist ing smell. The amount of pared to the amount of am; discharge appears to ificant impact downstrea	i discharge is significant normal flow in receiving o be having a	discharge; flow mostly clear and or rge has a color and/or odor, the am rge is very small compared to the s nd any impact appears to be minor,	nount of stream's base	have dry weather ing; or appearance rosion problems.
Skemon (Ni ormo	5	4	3	2	
Sketch/Notes:					
)			R	REPORTED TO AUTHORITIES	S: YES NO

Notes-

Г

Stream Crossing SC

WATERSHED	/subshed: Tucker			DATE: 7	1/ 108	ASSE	SSED BY: 🌾	MB. DRB
URVEY REA	сн ID: + В 04С	<u>Тіме: [[: Ч</u>	SAN/PM	Рното ID	: (Camera-Pie	c #)	/#	/
SITE ID: (Con	dition-#) SC- <u>Ol</u> LAT	41.48.41	<u>4</u> " Long	12:28.	<u>55</u> " L	мк	GPS (U	Jnit ID)
TYPE: 🗌 Roa	ad Crossing 🔲 Railroad Crossi	ng 🕅 Manmade	Dam 🔲 Beave	er Dam 🔲	Geological For	nation 🗵	Other: Bri	dgeate
FOR ROAD/ RAILROAD CROSSINGS ONLY	SHAPE: Arcfi Bottomless Box Elliptical Circular Other: CONDITION: (Evidence of)	# BARRELS:	MATERIAL: Concrete Metal Other:	Flo	NMENT: ow-aligned t flow-aligned not know CERT SLOPE:	Barrel dia Culvert le	Height:	able, sketch)(ft)(ft)(ft)(ft)
	Cracking/chipping/corrosion Sediment deposition	n 🔲 Downstream		🗌 🔲 Sli	ght (2° – 5 ⁰ ) vious (>5°)	Roadway	elevation:	(ft)
POTENTIAL ]	RESTORATION CANDIDATE	Fish barrier re			placement	Upstream st	torage retrofi	t
IS SC ACTING	G AS GRADE CONTROL	No X	es 🗌 Unk	nown				
	EXTENT OF PHYSICAL BLC		,	BLO	CKAGE SEVE	RITY: (circ	le #)	
If yes for fish barrier	Flow too shallow Water D	rop: <u>5</u> , (in)	A structure such a road culvert on a greater stream bl upstream movem anadromous fish; passage device p	3rd order or ocking the ent of no fish	A total fish blocka tributary that wou significant reach or partial blockag interfere with the anadromous fish	ld isolate a of stream, le that may migration of	beaver dam o the very head very little viabl	arrier such as a r a blockage at of a stream with e fish habitat ral barriers such
<u></u>	Other:		5		4 3		2	1
NOTES/SKET	cm:	westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly westerly wes	('enew hrat	terfal	.¥ 11 /dam			
					Repor	RTED TO AU	THORITIES [	] Yes 🗍 No

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Stream Crossing

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	/SUBSHED: TUCCEP			DATE:	11108	Assi	ESSED BY: KMG
URVEY REA			_AM/PM	Рното I	D: (Camera-Pi	c #)	/#
SITE ID: (Con	dition-#) SC- <u>07</u> LAT	41.48.4	Z" LONG	12-24	<u>'50 "</u> L	MK	_ GPS (Unit ID)
TYPE: 🗌 Roa	d Crossing 🔲 Railroad Crossi	ng 🕅 Manmade	Dam 🗌 Beave	er Dam	Geological For	mation <b>Г</b>	] Other:
For Road/ Railroad Crossings Only	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS: Single Double Triple Other:	MATERIAL: Concrete Metal Other:	ALIO F N	ALIGNMENT: Flow-aligned Not flow-aligned Do not know		SIONS: (if variable, sketch ameter:( Height:(
	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	n 🔲 Downstrean			VERT SLOPE: lat light (2° – 5 ⁰ ) bvious (>5°)	Culvert le Roadway	ength:( Width:( / elevation:
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re			eplacement 🔲 🛛	Upstream s	storage retrofit
IS SC ACTING	G AS GRADE CONTROL		es 🔲 Unkr	nown			
	EXTENT OF PHYSICAL BLO	CKAGE:		BL	OCKAGE SEVER	RITY: (circ	cle #)
If yes for fish barrier	CAUSE: Drop too high Water Dr Flow too shallow Water Dr Other:	rop: <u>36</u> (in)	A structure such a road culvert on a 3 greater stream blo upstream moveme anadromous fish; passage device pr	Brd order or ocking the ent of no fish	A total fish blocka tributary that wou significant reach or partial blockag interfere with the anadromous fish.	Id isolate a of stream, e that may migration of	A temporary barrier such a beaver dam or a blockage the very head of a stream v very little viable fish habitat above it; natural barriers su as waterfalls.
) Notes/Sket			5		4 (3)		2 1
	Stonel	Jool da vool de	m/ aterfall re tived	House	Æ		
		`			Repor	TED TO AU	THORITIES 🗌 YES [

Stream	Cros	sin

Stream Crossing	SC
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WATERSHED			TE: 7/1/68	110010	SED BY: K-MB
URVEY REA			юто ID: (Camera-Pid	c #)	/#
SITE ID: (Con	dition=#) SC- <u>63</u> LAT <u>41° 48 '3</u>	7_" LONG 72°	<u>28,45</u> " LI	MK	GPS (Unit ID)
					<b>~</b> .1
TYPE: Z Roa	ad Crossing Railroad Crossing Manmade	MATERIAL:	am Geological For		
For Road/ Railroad	SHAPE:       # BARRELS:         Arch       Bottomless         Box       Elliptical         Circular       Triple         Other:       Nother: 6	MATERIAL: Concrete Metal Other:	ALIGNMENT: Flow-aligned Not flow-aligned Do not know	Barrel dian H	Height:(ft)
CROSSINGS ONLY	CONDITION: (Evidence of)         Cracking/chipping/corrosion         Sediment deposition         Failing emb		CULVERT SLOPE: $\Box$ Flat $\Box$ Slight (2° – 5°) $\Box$ Obvious (>5°)		Width:(ft)
	Other (describe):			Roadway e	elevation: <u>(ft)</u>
POTENTIAL I	RESTORATION CANDIDATE  Fish barrier r		repair/replacement 🔲 🛛	Upstream stc	orage retrofit
IS SC ACTING	G AS GRADE CONTROL 🛛 🕅 No 🗌 Y	es 🗌 Unknow	'n		
	EXTENT OF PHYSICAL BLOCKAGE:		BLOCKAGE SEVER	RITY: (circle	e #)
If yes for fish barrier	□ Total       □ Partial         □ Temporary       □ Unknown         CAUSE:         □ Drop too high       Water Drop: (in)         □ Flow too shallow       Water Depth: (in)         □ Other:       □	A structure such as a c road culvert on a 3rd c greater stream blockin upstream movement o anadromous fish; no fi passage device preser	order or tributary that wou g the significant reach of or partial blockag sh interfere with the anadromous fish.	Id isolate a of stream, e that may migration of	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.
   NOTES/SKET		5	4 3		2 1
Ľ			Repor	TED TO AUT	HORITIES 🗌 YES 🗌 NO

Trash and Debris

WATERSHED/SUB	SHED: Tucker		DATE: <u>7</u> /	(_/08	ASSESSED BY: KMB
JURVEY REACH I	D:TBOYC T	IME: 12: 27 AM/M	Рното ID: (Ca	amera-Pic #)	/#
SITE ID: (Condition	•#) TR- <u>02</u>   Lat <u>Ψ</u> •	48.40 " LON	072028.49	/_'' LMK	GPS: (Unit ID)
TYPE: Industrial Commercial Residential	MATERIAL:         Plastic       Paper         Tires       Constr         Appliances       Yard         Automotive       Other:	Waste	SOURCE: Unknown Flooding Ullegal dump Local outfall	LOCATION:	
POTENTIAL REST	TORATION CANDIDATE	Stream cleanup 🔲 Stre	am adoption segment	t 🏹 Removal/pr	evention of dumping
If yes for trash or debris removal		Heavy equipment 🔲 T			DUMPSTER WITHIN 100 FT:
CLEAN-UP POTENTIAL: (Circle #)	A small amount of trash (i.e., less than two pickup truck loads) located inside a park with easy access	A large amount of trash, of with easy access. Trash of a long period of time but few days, possibly with a s	may have been dumped o it could be cleaned up in small backhoe.	ver A large amour area, where ac	t of trash or debris scattered over a large ccess is very difficult. Or presence of drums of hazardous materials
×	5	4	(3)	2	1
Tree	e in pieces blue	2-10 ft	long dra	mater n	~ (ft
)				Reportei	D TO AUTHORITIES 🗌 YES 🔽 NO

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Trash and Debris

r	- 1	······································			A
WATERSHED/SUB	SHED: TUCKER		DATE: <u>7</u> /	08	ASSESSED BY: F-MB
JURVEY REACH I	D: TBOYC TI	ME: 12: 00 AM/M	Рното ID: (Ca	mera-Pic #)	1# 28
SITE ID: (Condition	-#) <b>TR-<u>01</u>   Lat <u>Ψ</u>[•</b>	46 . 44 " LONG	072.28.51	<u>-</u> " LMK	GPS: (Unit ID)
TYPE: Industrial Commercial Residential	MATERIAL:         Plastic       Paper         Tires       Construction         Appliances       Yard W         Automotive       Other:		SOURCE: Unknown Flooding Illegal dump Local outfall	LOCATION:	AMOTHER (ILD: 1
POTENTIAL REST	·	tream cleanup 🔲 Stre Other:	am adoption segment	🔀 Removal/pro	evention of dumping
If yes for trash or debris removal		Heavy equipment 🕅 T			DUMPSTER WITHIN 100 FT:
	WHO CAN DO IT: X V	Volunteers 🗌 Local C			🗌 Yes 🔲 No 🔣 Unknown
CLEAN-UP POTENTIAL: ( <i>Circle</i> #)	A small amount of trash (i.e., less than two pickup truck loads) located inside a park with easy access	A large amount of trash, c with easy access. Trash r a long period of time but few days, possibly with a s	nay have been dumped o it could be cleaned up ir	ver area, where ac	t of trash or debris scattered over a large cess is very difficult. Or presence of drums f hazardous materials
	(5)	4	3	2	1
Notes: pill	e of leaves and	yard clipp	ings		
			11-2-2007-000-1	REPORTED	TO AUTHORITIES 🗌 YES 🕅 NO

TR

	e: <u>_{</u>	-	END TIME:	DATE: _6 /	LMK:	SSED BY: DCK 35 PM GPS ID:
	SLO" LONG A MUNS Res. W.	<u>2°26 11.3</u> "	Lat <u>41 ° 50 '</u> Description: Cul	HA " LONG - WAT PA I-	12°26 · 14	<u>0</u> "
RAIN IN LAST 24 HO	URS 🗆 Heavy rain	☑ Steady rain □ Trace	PRESENT CONDITIONS	□ Heavy rain □ Trace	Steady rain	□ Intermittent □ Partly cloudy
SURROUNDING LANI		l 🗌 Commercial rse 🗌 Park	□ Urban/Residential □ Crop	□ Suburban/Res □ Pasture	Forested	□ Institutional that
AVERAGE	CONDITIONS (che	ck applicable)	REACH	SKETCH AND SI	TE IMPACT TR	ACKING
BASE FLOW AS % CHANNEL WIDTH	○ 0-25% □ 25-50 %	□ 50%-75% □ 75-100%	Simple planar sketch o within the survey red features d	of survey reach. Tra ach (OT, ER, IB,SC, deemed appropriate	UT, TR, MI) as we	ell as any additional
DOMINANT SUBSTRA Silt/clay (fine or s) Sand (gritty) Gravel (0.1-2.5)	slick) $\Box$ Control Con	obble (2.5 –10") oulder (>10") od rock	BRAIDED OT	010 400		I-84
WATER CLARITY	aturally colored)		OUTFALL CHANNELS NOCUMENT 500 TLOW	prototic cu	UNT Or pooling 5 v	ATER a los
AQUATIC PLANTS IN STREAM	<i>,</i> .	e □ some □ lots e □ some □ lots	4	A	5 (	Line Still
WILDLIFE IN OR AROUND STREAM	(Evidence of) □ Fish □ Beav □ Snails □ Other	· • • • • • • • • • • • • • • • • • • •	x - Choin him		1015	Solution for the form
STREAM SHADING (water surface)	Mostly shaded ☐ Halfway (≥50% ☐ Partially shaded ☐ Unshaded (< 25	5) I (≥25% )		( ( ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	nue	Hree h
CHANNEL Dynamics	Downcutting Widening Headcutting	Bed scour Bank failure Bank scour				Fire
Unknown	Aggrading Sed. deposition	Slope failure		×		No.
CHANNEL Brown	Height: LT bank	<u>NOBOOK</u> (ft) <u>NOBOOK</u> (ft)		ling for	it one	
(FACING NO TRU DOWNSTREAM)CHOMMUND OF No Phile	Width: Bottom	$\frac{3}{6} \frac{5}{6} (ft)$	lint	Will Pe By	Nr.	
R	EACH ACCESSIBILI		D('v'	Mr Dr. Di		_
Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy	Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas	Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/or located a great distance from stream.	B	it left &	- TOOK Chomel Nong	Stream wisth SFROM TWOPDITS
equipment using existing roads or trails. 5 (4	small or distant from stream.	Specialized heavy equipment required.	Walker's Res	MOIZ WEST		7-B '
NOTES: (biggest probl	the second se		WOIKers Les	WUNC WYSY		

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<u>}</u>	Optimal	Suboptimal	Marginal	Poor
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat of habitat is obvious; substra unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 (
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the stream surfaces covered by vegetation disruption of streambank vegetation is very high; veget has been removed to 5 centimeters or less in avera stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 (1)
	Right Bank 10 9	8 7 6	5 4 3	2 1 (0)
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks both sides of the stream erod a fast rate; erosion contributir significant amount of sedimer stream; obvious threat to prop or infrastructure.
Monte	Left Bank 10 9	8 7 6	5 4 3	2 1 0
· · · ·	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bank not able to enter floodplain. Stream deeply entrenched.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 (0
	UVER	ALL BUFFER AND FLOODPLA	N CONDITION	
	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: or no riparian vegetation due human activities.
	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegeta type is turf or crop land
	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence o standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	Moderate floodplain encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function	Significant floodplain encroachment (i.e. fill material land development, or man-ma structures). Significant effect of floodplain function
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0

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WATERSHED/SUBSHI	ED: Wolling	ZUSENDAV	DATE: <u>61410</u>	ASSESSED BY	K: JK, GA, JS, Z
JURVEY REACH ID:		ME: <u>/0</u> : <u>35</u> AM/PM	PHOTO ID: (Camera-F	and the second s	
SITE ID (Condition-#);	0T- <u>0 </u> LA	NT 410 5D 1377	"LONG 72 ° 76 '14.0		GPS: (Unit ID
BANK: LT RT Head FLOW: None Trickle	TYPE:	MATERIAL: Concrete M PVC/Plastic Bi Other:	rick Elliptical Triple	DIMENSIONS: Diameter: SKAA	SUBMERGEI
Moderate Substantial Other:	Open channel	Concrete Eart	then Trapezoid I Parabolic V	Depth:(ir Width (Top):(ir " (Bottom):(ir	NOT APPEICABL
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: NO Gas Sewage Rancid/Sour Sulfide Other:	DEPOSITS/STAINS:	VEGGIE DENSITY: None Normal Inhibited Excessive Other:		s □Colors □O
<b>OTHER</b> Exc	DITY: Non	e Slight Cloudiness e Sewage (toilet pa astic bags) Dun	s Cloudy Opaque per, etc.) Petroleum nping (bulk) Excessive	Orange Red	] Other:
FLOWING ONLY     TURBI       ONLY     FLOAT       OTHER     Exa       ONCERNS:     New       POTENTIAL RESTORA       no	DITY: Non- ABLES: Non- cess Trash (paper/pla eds Regular Mainter ATION CANDIDATH	e Slight Cloudiness e Sewage (toilet pa astic bags) Dum nance Banl	s Cloudy Opaque per, etc.) Petroleum nping (bulk) Excessive k Erosion Other: L gation Stream daylighting	Orange       Red         (oil sheen)       []         Sedimentation       [] $\mathcal{L}essivL \rightarrow 2$ []         Local stream repair       []	] Other: Bissing air/outfall stabilization
FLOWING ONLY     TURBI       ONLY     FLOAT       OTHER     Exc       CONCERNS:     New       POTENTIAL RESTORA       Ino       If yes for daylighting:	DITY: Non- ABLES: Non- cess Trash (paper/pla eds Regular Mainter ATION CANDIDATI	e Slight Cloudiness e Sewage (toilet pa astic bags) Dun hance Bank C Discharge investig Storm water retrof	s Cloudy Opaque per, etc.) Petroleum nping (bulk) Excessive k Erosion Other: L gation Stream daylighting	Orange       Red         (oil sheen)          Sedimentation          QCESSIVE       P E         Local stream repair          Local stream repair	] Other: BCIS air/outfall stabilizatio CS / ATAPS H
FLOWING ONLY     TURBI       ONLY     FLOAT       OTHER     Exc       CONCERNS:     New       POTENTIAL RESTORA       Ino       If yes for daylighting:	DITY: INON ABLES: INON Cess Trash (paper/pla eds Regular Mainter ATION CANDIDATI Ver from outfall:	e Slight Cloudiness e Sewage (toilet pa astic bags) Dun hance Banl E Discharge investig Storm water retrof ft Type of Land Us	s Cloudy Opaque per, etc.) Petroleum nping (bulk) Excessive k Erosion Other: L gation Stream daylighting it Other: Clear ( existing vegetation:	Orange       Red         (oil sheen)       [         Sedimentation       [         QCESSIVE       P         Local stream repairs       [         Local stream repairs       [         Local stream repairs       [         Slop       [	] Other: BCIS air/outfall stabilizatio CS / ATAPS H
FLOWING ONLY       TURBIT         OTHER       Exa         OTHER       Exa         ONCERNS:       Net         POTENTIAL RESTORA       Ino         If yes for daylighting:       Length of vegetative cov         If yes for stormwater:       Is stormwater currently of         Yes       No       No         OUTFALL       He         SEVERITY:       co         (circle #)       str	DITY:       Non.         ABLES:       Non.         ABLES:       Non.         cess Trash (paper/plaeds Regular Maintenders)       Non.         eds Regular Maintenders       Non.         ATION CANDIDATH       Non.         /er from outfall:       Non.         /	e Slight Cloudiness e Sewage (toilet pa astic bags) Dum hance Banl E Discharge investig Storm water retrof ft Type of Land Us Area ava inct color and/or a f discharge is significant normal flow in receiving to be having a am.	s       Cloudy       Opaque         per, etc.)       Petroleum         nping (bulk)       Excessive         k Erosion       Other:       gation         gation       Stream daylighting       it       Other:         gation       Stream daylighting       it       Other:       Clow         rexisting vegetation:	Orange       Red         (oil sheen)       [         Sedimentation       [         QCESSIVE       Q         Local stream reparation       [         John Stream reparation       [         Slop       [         Dedorless. If the nount of stream's base       Outfall of discharged	] Other: BCIS air/outfall stabilizatio CS / ATAPS H
FLOWING ONLY     TURBI FLOAT       OTHER     Exa       OTHER     Exa       ONCERNS:     Nea       POTENTIAL RESTORA     Ino       If yes for daylighting:     Length of vegetative cov       If yes for stormwater:     Is stormwater currently of       Yes     No       OUTFALL     He       SEVERITY:     co       (circle #)     str	DITY:	e Slight Cloudiness e Sewage (toilet pa astic bags) Dun hance Bank E Discharge investig Storm water retrof ft Type of Land Us Area ava inct color and/or a f discharge is significant normal flow in receiving to be having a	s       Cloudy       Opaque         per, etc.)       Petroleum         nping (bulk)       Excessive         k Erosion       Other:       L         gation       Stream daylighting       It       Cother:       L         gation       Stream daylighting       It       Cother:       L         rexisting vegetation:	Orange       Red         (oil sheen)       [         Sedimentation       [         QCESSIVE       Q         Local stream reparation       [         John Stream reparation       [         Slop       [         Dedorless. If the nount of stream's base       Outfall of discharged	Other:         Bis         air/outfall stabilization         ics       / Angs H         e:
FLOWING ONLY       TURBI FLOAT         OTHER       Exa         CONCERNS:       New         POTENTIAL RESTORATION       Ino         If yes for daylighting:       Length of vegetative cov         If yes for stormwater:       Is stormwater currently of         Yes       No         OUTFALL       He         SEVERITY:       co         (circle #)       str         SKETCH/NOTES:       Str	DITY: DITY: DITY: DITY: DITY: DITY: ABLES: Non- ABLES: Non- cess Trash (paper/pla eds Regular Mainten add Regular Mainten ATION CANDIDATH /er from outfall:	e Slight Cloudiness e Sewage (toilet pa astic bags) Dum hance Banl E Discharge investig Storm water retrof ft Type of Land Us Area ava inct color and/or a f discharge is significant normal flow in receiving to be having a am. 4	s       Cloudy       Opaque         per, etc.)       Petroleum         nping (bulk)       Excessive         k Erosion       Other:       gation         gation       Stream daylighting       it       Other:         gation       Stream daylighting       it       Other:       Clow         rexisting vegetation:	Orange       Red         (oil sheen)       []         Sedimentation       []         Question       []         Local stream reparation       []         Decords stream reparation       []         Slop       []         Decords stream reparation       []         Outfall of stream's base // localized.       []         Question       []	Other:         Bit         air/outfall stabilization         discrete         discrete         e:

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Stream	Crossing

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WATERSHED		RESCUOIR		DATE: 6			SSED BY: JK, 6A, JS, EL
URVEY REA	and the second se	TIME: :	_AM/PM		D: (Camera-Pic		<u>I# 13 +14</u>
SITE ID: (Con	dition=#) SC01 LAT	<u>41 ° 50 · 37</u>	<u>1</u> " LONG	10 26 '	<u> 4.0 '' LN</u>	/IK	GPS (Unit ID)
TYPE: 🕅 Roa	nd Crossing 🔲 Railroad Crossi	ng 🗌 Manmade	Dam 🗌 Beau	er Dam	Geological Forn	nation [7]	Other
FOR ROAD/ RAILROAD	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS: Single Double Triple	MATERIAL: Concrete Metal	ALIG	NMENT: ow-aligned of flow-aligned o not know	DIMENS Barrel dia	IONS: (if variable, sketch)
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):			∏ Fla ∏_Sli	/ERT SLOPE: at ght $(2^{\circ} - 5^{\circ})$ avious (>5°)		ength: <u>65D</u> (ft) Width:(ft) elevation: <u>20</u> (ft)
🗌 no	RESTORATION CANDIDATE		repair 🕅 Oth	er: <u>L</u> émi	placement [] U ave Debizij		torage retrofit
15 SU ACTINO	G AS GRADE CONTROL		es 🗌 Unk			*****	1 11
If yes for fish barrier	EXTENT OF PHYSICAL BLC Total Partial Temporary Unknow CAUSE: Drop too high Water Di Flow too shallow Water D Other:	wn rop: (in)	A structure such road culvert on a greater stream bi upstream moven anadromous fish passage device p	as a dam or 3rd order or ocking the ient of no fish	A total fish blockag tributary that woul significant reach o or partial blockage interfere with the r anadromous fish.	ge on a d isolate a f stream, that may	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.
) N a			5		4 3		2 1
NOTES/SKET							
)					REPORT	ED TO AU	THORITIES 🗌 YES 🗌 NO

SURVEY REACH ID: <u>W202</u> WTRSHD/SUBS	ID: Workers Reservir	Date: <u>6/ 4</u> /	OB ASSESSED BY	
START TIME: 11:35 AM/PM LMK	: <i>END</i> <b>TIME:</b>	1:40 AM/PM	LMK:	GPS ID:
LAT 41° 50 ' 54.3" LONG 72° 26	264" LAT41050 '	52.0" LONG 72°	26 . 23,9"	
DESCRIPTION: I-84 CULVART	DESCRIPTION:	84 Colvert	Sedge Ferd Pore	>
RAIN IN LAST 24 HOURS 🗆 Heavy rain 🛛 🖄 Steady	rain <b>PRESENT CONDITIONS</b>	🗆 Heavy rain 🛛 🕅	Steady rain 🗆 Inter	rmittent
□ None □ Intermittent □ Trace	Clear	Trace 🗌	Overcast  Part	tly cloudy
SURROUNDING LAND USE:  Industrial Cot Golf course Park			Forested Insti	tutional
AVERAGE CONDITIONS (check applicable,		SKETCH AND SITE I	コントリアン さきょうかく はっしょうがく しゅうぶく トレットがった	Style Street and a street of the street of t
Base Flow as %         □ 0-25%         ⊠ 50%-           Channel Width         □ 25-50 %         □ 75-	100% within the survey red	of survey reach. Track lo ach (OT, ER, IB,SC, UT, 1 deemed appropriate. Ind	TR, MI) as well as any	
DOMINANT SUBSTRATEIp (pp)Silt/clay (fine or slick)A Cobble (2.5 -1)Sand (gritty)Boulder (>10"Gravel (0.1-2.5")Bed rock	0")	accinca appropriate. Tha	<b>,</b> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
WATER CLARITY Clear Turbid (suspended) Stained (clear, naturally colored) Opaque (m. Other (chemicals, dyes)	natter) Iky)		critice st	ells wit/s
AQUATIC PLANTSAttached: ⊠ none □ someN STREAMFloating: ☑ none □ some			culyice 5	She he
WILDLIFE IN OR (Evidence of) AROUND STREAM STREAM STREAM		1-94	والمحافظ وال	and the second sec
XMostly shaded ( $\geq$ 75% coverSTREAM SHADING $\Box$ Halfway ( $\geq$ 50%)water surface) $\Box$ Partially shaded ( $\geq$ 25%)	rage)	Sack	into circu drain	Jar
□ Unshaded (< 25%)		A- ~ >	entron -	IS SE
CHANNEL Downcutting Bed	scour	1875	and the first and the contract of the second s	n της ματική της της παραγολημητής της της της της της της της της της τη
DYNAMICS 🗌 Widening 🛛 🔲 Banl	failure	JUAN	56-01	
	scour	WYD IN	7.St	
	e failure melized	1		
HANNEL Height: LT bank 1.0	(ft)		CHOIN LIN FEALL	JK -
DIMENSIONS RT bank 1. D	(ft)	$\gamma$ $h$ .	Fence	Nº.
FACING Width: Bottom		1 1 ron	NR 5	
DOWNSTREAM) Top 4	(ft)	y's	10/2	-
REACH ACCESSIBILITY			202	
cood: Open area in Fair: Forested or Difficult. Mus	t cross	1.011	) dr	
ublic ownership developed area wetland, steel				
ufficient room to Access requires tree stream. Few			- s.t	
asy stream channel removal or impact to stockpile avai	able		- nett	
ccess for heavy landscaped areas. and/or located			aw.	
visting roads or trails small or distant from Specialized h				
stream. equipment rec			(DIN AN N	
5 4 (3) 2 NOTES: (biggest problem you see in survey reach)		<u>56299</u>	ICH PUR'S	
(orgest problem you see in survey reach)				

	Optimal	Suboptimal	Marginal	Poor
N-STREAM HABITAT (May modify criteria based on appropriate habitat	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lac of habitat is obvious; substrate unstable or lacking.
habitat regime)	20 19 18 17 16	rate at high end of scale).	(10) 0 0 7 (	
VEGETATIVE	1		(10) 9 8 7 6	5 4 3 2 1 0
(score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streamban surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 (3)	2 1 0
	Right Bank 10 9	8 7 6	5 (4) 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to propert or infrastructure.
	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	1	ALL BUFFER AND FLOODPLA	IN CONDITION	
	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: littl or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 (3)	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vegetatio type is turf or crop land
	20 19 18 17 16	15 14 13 12 (1)	10 9 8 7 6	5 4 3 2 1 0
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	1	Minor flood alon on group hand in the	Moderate floodplain	Significant floodplain
Floodplain Encroach- ment	No evidence of floodplain encroachment in the form of fill material, land development, or manmade structures 20 19 18 17 16	Minor floodplain encroachment in the form of fill material, land development, or manmade structures, but not effecting floodplain function	encroachment in the form of filling, land development, or manmade structures, some effect on floodplain function 10 9 8 7 6	encroachment (i.e. fill material, land development, or man-made structures). Significant effect on floodplain function 5(4) 3 2 1 0

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Stream	Cros	sing

Stream Crossing	SC

			1				
1	SUBSHED: WONCO'S Re		~		14104		SSED BY: 14, 64, 15, 27
URVEY REA	Constant and the second of the second s	TIME: <u>// : 40</u>			<b>):</b> (Camera-Pie		/#
SITE ID: (Con	ndition-#) SC- <u>Dl</u> LAT	<u> 1 ° 30 ' 57</u>	20" LONG <u>72</u>	<u>° 26 '</u>	<u>23.9</u> " LI	МК	GPS (Unit ID)
TYPE: 🕅 Roa	ad Crossing 🔲 Railroad Crossi	ng 🔲 Manmade	Dam 🗌 Beaver	Dam 🗌	Geological For	nation 🔲	Other:
FOR ROAD/ RAILROAD	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS: Single Double Triple Other:	MATERIAL: Concrete Metal Other:	Flo	NMENT: ow-aligned ot flow-aligned o not know	Barrel dia	Height:(ft)
CROSSINGS ONLY	CONDITION: (Evidence of) Cracking/chipping/corrosion Sediment deposition Other (describe):	n 🔲 Downstrear 🗍 Failing emb		Fla	<b>VERT SLOPE:</b> at ght $(2^{\circ} - 5^{\circ})$ ovious $(>5^{\circ})$		ngth: <u>325 (ft)</u> Width:(ft) elevation: <u>25 (ft)</u>
POTENTIAL I	RESTORATION CANDIDATE	Fish barrier re	emoval 🗌 Culvert repair 🔲 Other:	repair/re	placement 🔲 🛛	Jpstream st	orage retrofit
	G AS GRADE CONTROL	No Y	es 🗌 Unkno	wn			
	EXTENT OF PHYSICAL BLO	CKAGE:	[	BLO	CKAGE SEVER	RITY: (circl	'e #)
If yes for fish barrier	Total Partial Temporary Unknow CAUSE: Drop too high Water Dr Flow too shallow Water Dr Other:	rop: (in)	A structure such as a road culvert on a 3rd greater stream block upstream movement anadromous fish; no passage device pres	order or ng the of fish ent.	A total fish blocka tributary that wou significant reach or partial blockag interfere with the anadromous fish.	Id isolate a of stream, e that may migration of	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.
NOTES/SKET			5		4 3		2 1
	·						
)					Repor	TED TO AUT	
							4

SURVEY REACH	D: WR03 W1	RSHD/SUBSHD: Wa	Wer's Reservoir DATE: 6/3/08 ASSESSED B	
LAT <u>41 ° 51 '</u>	ие: <u>3</u> :10_АМ/рм	1) LMK: 2 • 25 · 44.4 "	END TIME: 3:35 AM/PM LMK: LAT 4/0 5/07%" LONG 72025 42 (" DESCRIPTION: EN BEISCH AST CULVENT	GPS
RAIN IN LAST 24 HO	DURS 🗆 Heavy rain	□ Steady rain □ Trace	PRESENT CONDITIONS       □       Heavy rain       □       Steady rain       □       Int         □       Clear       □       Trace       □       Overcast       □       Particular	ermittent
SURROUNDING LAN	DUSE: 🗆 Industria	l 🗆 Commercial rse 🖸 Park		titutional
AVERAGE	CONDITIONS (che	ck applicable)	REACH SKETCH AND SITE IMPACT TRACKIN	łG
BASE FLOW AS % CHANNEL WIDTH	□ 0-25% □25-50 %	□ 50%-75% ⊠75-100%	Simple planar sketch of survey reach. Track locations and IDs for a within the survey reach (OT, ER, IB,SC, UT, TR, MI) as well as an features deemed appropriate. Indicate direction of flo	y addition
DOMINANT SUBSTR Silt/clay (fine or Sand (gritty) Gravel (0.1-2.5	slick) $\Box$ Co $\Box$ B	obble (2.5 –10") oulder (>10") ed rock		an and a state of the state of
WATER CLARITY	aturally colored)		2 3 TEND Suppop Very much	you
AQUATIC PLANTS IN STREAM		e $\square$ some $\square$ lots	Soulinger Sanping Report	
WILDLIFE IN OR AROUND STREAM	(Eyidence of) □/Fish ☑ Beav □/Snails □.Other			
STREAM SHADING (water surface)	⊠ Mostly shaded □ Halfway (≥50% □ Partially shaded □ Unshaded (< 25	(≥75% coverage) b) l (≥25% )	- 44 DOR DEPON	
CHANNEL DYNAMICS	Downcutting Widening Headcutting Aggrading Sed. deposition	Bed scour Bank failure Bank scour Slope failure Channelized	and the second s	
CHANNEL DIMENSIONS (FACING DOWNSTREAM)	Height: LT bank RT bank Width: Bottom	2.0 (ft) <u>2.75 (ft)</u> <u>14.0 (ft)</u>	Tro2st Devel Williament	
	Тор	<u>19.0</u> (ft)	Star City	
<b>Good:</b> Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.	REACH ACCESSIBILI Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.	Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.	And the state of t	
5 NOTES: (biggest prol	1 3 2 olem you see in survey	t 1 reach)	Ver 12 W3	
)		<i>,</i>		
			<b>R</b> EPORTED TO AUTHORITIES	

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1	Optimal	Suboptimal	Marginal	Poor
JIN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habita of habitat is obvious; substra unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the stream surfaces covered by vegetat disruption of streambank vegetation is very high; vege has been removed to 5 centimeters or less in aven stubble height.
	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 (6)	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall bank both sides of the stream erod a fast rate; erosion contributi significant amount of sedime stream; obvious threat to pro or infrastructure.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than ban not able to enter floodplain. Stream deeply entrenched.
	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1
	Over	ALL BUFFER AND FLOODPLA	IN CONDITION	
	Optimal	Suboptimal	Marginal	Poor
VEGETATED Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 fee or no riparian vegetation due human activities.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field	Predominant floodplain vege type is turf or crop land
	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1
Floodplain Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
	No evidence of floodplain	Minor floodplain encroachment in the	Moderate floodplain encroachment in the form of	Significant floodplain encroachment (i.e. fill materia
Floodplain Encroach- ment	encroachment in the form of fill material, land development, or manmade structures	form of fill material, land development, or manmade structures, but not effecting floodplain function 15 14 13 12 11	filling, land development, or manmade structures, some effect on floodplain function	land development, or man-ma structures). Significant effect floodplain function 5 4 3 2 1 0

JURVEY REACH I	SHED: Wolker	RIDENDIZ	DATE: <u>6</u> /	3/04 Ass	ESSED BY:	35, GA, 707
	D: WR03	TIME: 3 : 35 AM/R	М Рното ID: (	Camera-Pic#) 🖽		- france
SITE ID (Condition-4	ŧ): OTO[	LAT 41 ° 51 ' 7	8 "LONG 72 ° 25	<u>'42.8"</u> LM	K	GPS: (Unit ID)
BANK: □LT XRT □ He FLOW: □ None □ Tric	Closed	MATERIAL: Concrete X PVC/Plastic C Other:	Metal 🔽 Circular	Double	NSIONS: ter: <u>4.5 fi</u> n	SUBMERGED:
Moderate Substantial	Dpen channel	Concrete E	Earthen Trapezoid Parabolic Other:	Depth: Width (Top) " (Bottom)		NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint	ODOR: XN	□ None □Oily	X None	SITY: PIPE B Brow Othe	vn 🗌 Oran	OWTH: None nge 🗌 Green
Corrosion	☐Rancid/So ☐ Sulfide ☐ Other:	ur Plow Line Paint Other:	☐ Inhibited ☐ Excessive ☐ Other:	Good Good Good Good Good Good Good Good		
FLOWING ONLYTu FLOOTHER□	LOR: DATABLES: D	lone Slight Cloudin lone Sewage (toilet /plastic bags) D	ness     Cloudy       t paper, etc.)        Dumping (bulk)	Green Orange Opaque Petroleum (oil sheen) Excessive Sedimenta Other:		Other: Other:
FLOWING     Tui       ONLY     FLO       OTHER     □       CONCERNS:     □       POTENTIAL RESTORED	RBIDITY:	Ione       Slight Cloudin         Ione       Sewage (toilet         /plastic bags)       D         itenance       B         ATE       Discharge investion	Dess       Cloudy          t paper, etc.)          Dumping (bulk)          Bank Erosion          estigation          Stream day	Opaque Petroleum (oil sheen) Excessive Sedimenta Other:	ttion	Other:
FLOWING ONLY     Tui FLO       OTHER     I       CONCERNS:     I       POTENTIAL RESTOR     I       Ino     I	RBIDITY:	lone Slight Cloudin lone Sewage (toilet /plastic bags) D ntenance B	Dess       Cloudy          t paper, etc.)          Dumping (bulk)          Bank Erosion          estigation       Stream day	Opaque Petroleum (oil sheen) Excessive Sedimenta Other:	ttion	Other:
FLOWING ONLY     Turnow       OTHER     FLOWING       OTHER     Concerns:       CONCERNS:     Concerns:       POTENTIAL RESTOR     Concerns:       Ino     If yes for daylighting	RBIDITY:     Image: Provide the second	Ione       Slight Cloudin         Ione       Sewage (toilet         /plastic bags)       D         itenance       B         ATE       Discharge investion	Dess       Cloudy          t paper, etc.)          Dumping (bulk)          Bank Erosion          Bank Erosion          estigation          Stream day          trofit	Opaque Petroleum (oil sheen) Excessive Sedimenta Other:	ttion	Other: /outfall stabilization
FLOWING ONLY     Tur FLO       OTHER     FLO       OTHER     Concerns:       Concerns:     Concerns:       POTENTIAL RESTOR     Concerns:       If yes for daylightin       Length of vegetative       If yes for stormwath       Is stormwater current	RBIDITY:       Image: 1         DATABLES:       Image: 1         Excess Trash (paper Needs Regular Mair         DRATION CANDIDA         mg:         cover from outfall:         er:         tly controlled?	Ione       Slight Cloudin         Ione       Sewage (toilet         /plastic bags)       E         intenance       B         ATE       Discharge inveg         Storm water ret       ft        ft       Type         Land	Dess       Cloudy       I         t paper, etc.)       I         Dumping (bulk)       I         Bank Erosion       I         estigation       Stream day         trofit       Other:         e of existing vegetation:_         Use description:_	Opaque Petroleum (oil sheen) Excessive Sedimenta Other:	ttion tream repair/	Other: /outfall stabilization
FLOWING ONLY     Tur FLO       OTHER     FLO       OTHER     FLO       CONCERNS:     FLO       POTENTIAL RESTOR     FLO       Ino     If yes for daylighting       Length of vegetative     If yes for stormwate	RBIDITY:       Image: Control Contro Control Control Control Control Control Control Control Control C	Ione       Slight Cloudin         Ione       Sewage (toilet         /plastic bags)       E         intenance       B         ATE       Discharge inverted        ft       Type         ft       Type         distinct color and/or a         int of discharge is significant         tof normal flow in receiving         ass to be having a	Dess       Cloudy       I         t paper, etc.)       I         Dumping (bulk)       I         Bank Erosion       I         estigation       Stream day         trofit       Other:         c of existing vegetation:       I	Opaque Petroleum (oil sheen) Excessive Sedimenta Other: lighting Local s y clear and odorless. If the odor, the amount of pared to the stream's base	tream repair/	Other: /outfall stabilization

LAT 51 ° 51 ' 3.5 "       LONG 72 ° 25 ' 555"         DISCRIPTION: 51 of a Televice of the second	SURVEY REACH ]	<b>D: <u>1</u>204 Wti ie:<u>8:52</u>ам/рм</b>	RSHD/SUBSHD: WO	IKER RESCUDIR     DATE:     6/4/08     ASSESSED BY:       END     TIME:     9:     41 AM/PM     LMK:     GPS ID:
RAIN IN LAST 24 LOURS       Heavy min       Steady min       Ste	Lat <u>41°51'</u>	7.5/" LONG 7	20 25 14258"	LAT 41 ° 5] ' 13.3 " LONG 72° 25 ' 45.3"
□ None       □ Intermittent       □ Trace       □ Oraceat       □ Party cloudy         SURROUNNING LAND USE:       □ Industrial       □ Commercial       □ Urban/Residential       □ Surested       □ Instructional         AVTERACE CONDITIONS (check applicable)       Coop       □ Parture       □ Coop       □ Durban/Res       □ Forested       □ Instructional         CREANCE WORTH       □ C255%       Ø (50%-75%)       Ø (50%-75%)       □ Statised (check applicable)       Statised (check applicable)         Dymmant Stuttmer       □ Cobble (2.5-10%)       □ Statised (check applicable)       Statised (check applicable)       Statised (check applicable)       Discourse (-10%)       □ Gravel (0.1-2.5%)       □ Boulder (-10%)         □ Gravel (0.1-2.5%)       □ Boulder (-10%)       □ Dong @ (check applicable)       □ Dong @ (check applicable)       □ Dong @ (check applicable)         Statised (check ansurally colored)       □ Opaque (milky)       □ Other (chemicals, dyes)       □ Opaque (milky)         Other (chemicals, dyes)       □ Donder (-25%)       □ Donder (-25%)       □ Donder (-25%)         Statised (check applicable)       □ Sonale genotic       □ Sonale genotic       □ Sonale genotic         Nother Submant       □ Donder (-25%)       □ Donder (-25%)       □ Donder (-25%)       □ Donder (-25%)         Channelized       □ Donder (	DESCRIPTION: 510	ret of Reach,	of culvati	DESCRIPTION: CUlvert nt BL767 7242 I-84
Golf course       Park       Cop       Pasture       Worker       Other:		-	-	
AVERAGE CONDITIONS (check applicable)       REACH SKETCH AND SITE IMPACT TRACKING         BASE FLOW AS %       0-25%       \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$	SURROUNDING LAN			
CHANNEL WIDTH 225-50 % 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100% 75-100%	AVERAGE	CONDITIONS (chec	k applicable)	
Dominant Substrate SilvClop (in e or slick) Cobble (2.5–10") Sand (grity) Boulder (>10") Gravel (0.1-2.5") Bed rock WATER CLARITY Clear Murbid (suspended matter) Stained (clear, neurally colored) Opaque (milky) Other (chemicals, dvez) AQUATIC PLANTS Attached: none Some lots IN STREAM Floating: none Some lots WILDLIFE IN OR AROUND STREAM Stailing Chore: ( <u>Access 64:55</u> ) por S STREAM Stailing (Chore: ( <u>Access 64:55</u> ) por S Unknown (Chore: ( <u>Access 64:55</u> ) por S Stope failure Unknown ( <u>Access 64:55</u> ) ( <u>Chore: 64:55</u> ) Stope failure God: Gen area in politic ownessing, sufficient conton Stope failures Stope failures Stope failures Stope failures Stope failures Chore: 55: 50 Stope failures Stope failures Chore: 55: 50 Stope failures Chore: 55: 50 Stope failures Stope failures Sto				within the survey reach (OT, ER, IB,SC, UT, TR, MI) as well as any additional
□ Stained (clear, naturally colored)       □ Opaque (milky)         □ Other (chemicals, dyss)         Aquatic PLANTS       Attached:       □ none       ∆ some       □ lots         IN STREAM       Floating:       □ none       ∆ some       □ lots         WILDLIFE IN OR       Geode       □ Fish       □ Beaver       □ Deer         Arouvn STREAM       □ Fish       □ Beaver       □ Deer         Arouvn STREAM       □ Mostly shaded (>25% coverage)       QV.1+       6.7         STREAM SHADING       □ Halfway (>50%)       □ Unknaded (<25%)	気 Silt/clay (fine or 文 Sand (gritty)	slick) 🗆 Co 🗆 Bo	ulder (>10")	
IN STREAM       Floating:       none       Ksome       lots         WILDLIFE IN OR AROUND STREAM       Fish       Beaver       Deer         STREAM SHADING       Mostly shaded (275% coverage)       Mostly shaded (275% coverage)         Halfway (250%)       Winshaded (25%)         CHANNEL       Downcutting       Back failure         DYNAMICS       Widening       Back failure         Height:       LT bank       Chanelized         Minon       Stope failure       Stope failure         DIMENSIONS       RT bank       Chanelized         RCHANNEL       Height:       Difficult Must cross         Brit:       Forested or adjacent to stream. Stockple areas to get to stockple areas to get to stockple areas       Difficult Must cross         Stockple materials, easy stream chanels, easy stream chanels       Fair: Forested or equipment using equipment using equipment using equipment using equipment using equipment using       Difficult Must cross stockple areas       Stockple areas         (5)       4       3       1       1	$\Box$ Stained (clear, n	aturally colored) 🛛 🕻		
WILDLIFE IN OR AROUND STREAM       Fish       Beaver       Deer         AROUND STREAM       Fish       Beaver       Deer         STREAM SHADING (water surface)       Mostly shaded (>25%)       Partially shaded (>25%)         Unshaded (<25%)	•			
STREAM SHADING (water surface)       Halfway (250%)         (water surface)       Partially shaded (225%)         Unshaded (< 25%)		Fish Beave		and some and the second s
DYNAMICS       Widening       Bank failure         DYNAMICS       Headcutting       Bank failure         Headcutting       Aggrading       Slope failure         Unknown       Sed. deposition       Channelized         CHANNEL       Height: LT bank       Moscov (ft)         DIMENSIONS       RT bank       Moscov (ft)         CHACING       Width: Bottom       1         DOWNSTREAM)       Width: Bottom       1         Racket Accessibility       Officult Must cross         welland, steep slope, or solfcient room to stockpile materials, easy stream channel       Fair: Forested or developed area adjacent to stream. Access requires tree and/or located a great distance from stream. Stockpile areas small or distant from stream.       Difficult Must cross welland, steep slope, or sensitive areas to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.       Difficult a great distance from stream. Specialized heavy equipment required.       Scoop SC-OI         Sock 4       3       1		☐ Halfway (≥50%) A Partially shaded	(≥25%)	
L Unknown       Sed. deposition       Channelized         CHANNEL       Height: LT bank       NOBOOK (ft)         DIMENSIONS       RT bank       NOBOOK (ft)         (FACING DOWNSTREAM)       Width: Bottom       1         Good: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Fair: Forested or developed areas small or distant from steam.       Difficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile available and/or located a great distance from stream. Specialized heavy equipment using existing roads or trails.       Difficult areas small or distant from stream.       Difficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile available and/or located a great distance from stream. Specialized heavy equipment using existing roads or trails.       Fair: Forested or developed areas. Stockpile area		Widening Headcutting	Bank failure	RIPORAPIO U
Channel       RT bank       Discret (ft)         Dimensions       RT bank       P (ft)         (FACING DOWNSTREAM)       Width: Bottom       P (ft)         Top       9 (ft)         React Accessibility       Pifficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.       Pifficult for stream. Stockpile areas small or distant from stream.       Difficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.       Not for the for stream. Specialized heavy equipment required.	Unknown			Laiouns de la
(FACING DOWNSTREAM)       Width: Bottom       Image: Construction of the second				Contain which we we
Top(ft)REACH ACCESSIBILITYGood: Open area in public ownership, sufficient room to stockpile materials, easy stream channel access for heavy equipment using existing roads or trails.Fair: Forested or developed area adjacent to stream. Access requires tree stockpile areas small or distant from stream.Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile areas distance from stream. Specialized heavy equipment required.Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile areas mall or distant from stream.Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Few areas to stockpile areas small or distant from stream.Difficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile areas distockpile areas small or distant from stream.Difficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile areas small or distant from stream.Difficult. Must cross wetland, steep slope, or stockpile areas to get to stockpile areas small or distant from stream.Difficult. Must cross wetland, steep slope, or stockpile areas small or distant from stream.Difficult. Must cross wetland, steep slope, or stockpile areas small or distant from stream.Difficult area stockpile areas small or distant from stream.Difficult area stockpile area stockpile area stockpile area stockpile area stream.Difficult area stockpile area stockpile area stockpile area stockpile area stockpile area stockpile area stockpile area stockpile area 	(FACING		~	
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access for heavy equipment using existing roads or trails.     Stockpile areas small or distant from stream.     anabel of the stream. Specialized heavy equipment required.       (5)     4     3     2				Coltails + Conory (2055)
access for heavy equipment using existing roads or trails.     Stockpile areas small or distant from stream.     anabel of the stream. Specialized heavy equipment required.       (5)     4     3     2	sufficient room to	adjacent to stream.	sensitive areas to get to	First culout surrounsid
access for heavy equipment using existing roads or trails.     Stockpile areas small or distance from stream. Specialized heavy equipment required.     Stockpile areas specialized heavy equipment required.       (5)     4     3     2     1		removal or impact to	stockpile available	By 1575 of ANNUN Drive
existing roads or trails. Small or distant from Specialized heavy (5) 4 3 2 1 Specialized heavy equipment required. (259 + Vol r Pd	access for heavy	Stockpile areas	distance from stream.	
				SC-OI
NOTES: (biggest problem you see in survey reach)	······································	4 3 2	1	I WAY TOUL KO
	NOTES: (biggest prob	olem you see in survey r	each)	

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<u>}</u>	Optimal	Suboptimal	Marginal	Poor
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lac of habitat is obvious; substrate unstable or lacking.
	20 19 18 17 16	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streamban surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetatio has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks on both sides of the stream eroding a fast rate; erosion contributing significant amount of sediment to stream; obvious threat to propert or infrastructure.
NO RORA	Left Bank 10 9	8 7 6	5 4 3	2 1 0
··	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN Connection	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched. 20 19 (18) 17 16	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.
	Over	ALL BUFFER AND FLOODPLA		
	Optimal	Suboptimal	Marginal	Poor
VEGETATED BUFFER WIDTH	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: littl or no riparian vegetation due to human activities.
	Left Bank 10 9	8 7 6	5 (4) 3	2 1 0
	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0
FLOODPLAIN VEGETATION	Predominant floodplain vegetation type is mature forest	Predominant floodplain vegetation type is young forest	Predominant floodplain vegetation type is shrub or old field Wettom> PlonTS	Predominant floodplain vegetatio type is turf or crop land
	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0
FLOODPLAIN Habitat	Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	Either all wetland or all non- wetland habitat, evidence of standing/ponded water	Either all wetland or all non- wetland habitat, no evidence of standing/ponded water
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	No evidence of floodplain	Minor floodplain encroachment in the form of fill material, land	Moderate floodplain encroachment in the form of	Significant floodplain encroachment (i.e. fill material, land development, or man-made
ENCROACH-	encroachment in the form of fill material, land development, or manmade structures	development, or manmade structures, but not effecting floodplain function	filling, land development, or manmade structures, some effect on floodplain function	structures). Significant effect on floodplain function
FLOODPLAIN Encroach- ment	material, land development, or	development, or manmade structures,	manmade structures, some	structures). Significant effect

	Storm Water Outfalls						OT
WATERSHED/SUBSHE	D: Wallars	Reserven	1	DATE: 1014 105	Asses	SED BY:	Friends
SURVEY REACH ID:	NR OY T	'IME: 9:18 AM/PM	I	Рното ID: (Camera-Pi	c #)	/# 7	, 8
SITE ID (Condition-#):	DT- <u>02</u> L	AT 41 . 51 . 12. 8	UN	G 72 0 25 1 45.4"	LMK_		GPS: (Unit ID)
BANK: LT MRT Head FLOW: None Trickle	TYPE:	MATERIAL: Concrete M PVC/Plastic B: Other:	letal [ rick [	SHAPE: Single Circular Double Elliptical Triple	<b>DIMENS</b> Diameter	IONS:	SUBMERGED:
Moderate Substantial Other:	Open channel	Concrete Eart	^{then}	Parabolic W	epth: idth (Top): (Bottom):		NOT APPEICABLE
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: M NO Gas Sewage Rancid/Sour Sulfide Other:	□ None □Oily		VEGGIE DENSITY: None Normal Biffusion ¹ Inhibited Excessive Other:	Brown Other: POOL QU	Orang	
<b>GONCERNS:</b> Nee	DITY: DINO ABLES: DNO ess Trash (paper/p eds Regular Mainte	ne Slight Cloudines: ne Sewage (toilet pa lastic bags) Dur enance Ban	s [] aper, etc. nping (b k Erosio	oulk)	oil sheen) Sedimentatic	Don .	ther:
🔲 no	TION CANDIDAT	TE    Discharge investi      Storm water retrol		Stream daylighting [ Other:	Local stre	am repair/c	outfall stabilization
<i>If yes for daylighting:</i> Length of vegetative cov	er from outfall:	ft Type of	existing	g vegetation:		Slope:	o
If yes for stormwater: Is stormwater currently c ☐ Yes ☐ No ☐ Not		Land Us Area ava		iption:	<del>7/10/01</del>		
SEVERITY: stra (circle #) stra	npared to the amount o eam; discharge appear nificant impact downstr	of discharge is significant of normal flow in receiving s to be having a eam.	lischarge l lischarge i	harge; flow mostly clear and od has a color and/or odor, the am is very small compared to the st ny impact appears to be minor /	ount of ream's base localized.	discharge; si of causing a	not have dry weather taining; or appearance ny erosion problems.
SKETCH/NOTES:	5	4		3	2	2	1
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WATERSHED/SUBSHEI	·///all/a à	Pacarenia	DATE: 6 1 4 1		
SURVEY REACH ID: W		<u>FISEVIDIC</u> IME: <u>9</u> :05(AM)PM	DATE: <u>0</u> <u>7</u> <u>7</u> <u>7</u> Рното ID: (Camera		rilnd
SITE ID (Condition-#): O	an a		"Long <u>72</u> • <u>25</u> • <u>15</u>	· · · · · · · · · · · · · · · · · · ·	<u>, _0</u> GPS: (Un
Битень (солилон-т). С					
BANK:         Image: Head           LT         RT         Head           FLOW:         Image: Trickle         Trickle	TYPE:	MATERIAL: ☐ Concrete ☐M ☐ PVC/Plastic ☐Bi ☐ Other:		ble	SUBME
Moderate Substantial	Dpen channel	Concrete Eart	hen Trapezoid Parabolic Other:	Depth: <u>(in)</u> Width (Top): <u>(in)</u> " (Bottom): <u>(in)</u>	NOT APP
CONDITION:	ODOR: NO Gas Sewage Rancid/Sour	☐ None ☐Oily	VEGGIE DENSITY:	PIPE BENTHIC GRO	e 🗌 Gree
<ul> <li>Peeling Paint</li> <li>Corrosion</li> <li>Other:</li> </ul>	Sulfide	Paint Other:	<ul> <li>Inhibited</li> <li>Excessive</li> <li>Other:</li> </ul>	POOL QUALITY:	Colors
	BLES:   🛄 Noi ess Trash (paper/p ls Regular Mainte			Im (oil sheen) Ot version	her:
OTHER Exce CONCERNS: Need	ess Trash (paper/p ls Regular Mainte	lastic bags) 🗌 Dun enance 🗌 Ban	nping (bulk)	ive Sedimentation	
OTHER Exce CONCERNS: Need POTENTIAL RESTORAT no If yes for daylighting: Length of vegetative cover	ess Trash (paper/p ls Regular Mainte FION CANDIDAT	lastic bags) 🗌 Dun enance 🗌 Banl TE 🗌 Discharge investi	nping (bulk)	ive Sedimentation	
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OTHER       Excel         CONCERNS:       Need         POTENTIAL RESTORAT       Ino         If yes for daylighting:       Length of vegetative cove         If yes for itormwater:       Is stormwaer currently co         Yes       No         OUTFALL       Heat         SEVERITY       strom components         (circle #)       streets	ess Trash (paper/p ls Regular Mainte FION CANDIDAT FION CANDIDAT er from outfall: ontrolled? investigated vy discharge with a ding smell. The amount	lastic bags) Dun enance Banl TE Discharge investi Storm water retrof ft Type of Land Us Area ava istinct color and/or a of discharge is significant of normal flow in receiving s to be having a	nping (bulk)	ive Sedimentation g  Local stream repair/o Slope: dodorless. If the e amount of the stream's base of courses of the stream's base	not have dry v
OTHER       □ Exce         CONCERNS:       □ Need         POTENTIAL RESTORAT       □ no         If yes for daylighting:       Length of vegetative cove         If yes for itormwater:       Is stormwaer currently co         Yes □ No □ Not       OUTFALL         SEVERITY       corr         (circle #)       strong	er from outfall: ontrolled? investigated vy discharge with a ding smell. The amount pared to the amount cam; discharge appear	lastic bags) Dun enance Banl TE Discharge investi Storm water retrof ft Type of Land Us Area ava istinct color and/or a of discharge is significant of normal flow in receiving s to be having a	apping (bulk)       Excession         apping (bulk)       Excession         gation       Other:         gation       Stream daylighting         fit       Other:         existing vegetation:	ive Sedimentation g  Local stream repair/o Slope: dodorless. If the e amount of the stream's base of courses of the stream's base	not have dry v
OTHER       Excel         CONCERNS:       Need         POTENTIAL RESTORAT       Ino         If yes for daylighting:       Length of vegetative cove         If yes for itormwater:       Is stormwaer currently co         Yes       No         OUTFALL       Heat         SEVERITY       strom components         (circle #)       streets	ess Trash (paper/p ds Regular Mainte FION CANDIDAT FION CANDIDAT or from outfall: ontrolled? investigated vy discharge with a ding smell. The amount pared to the amount of am, discharge appear ificant impact downstr	lastic bags) Dun enance Banl TE Discharge investi Storm water retrof ft Type of Land Us Area ava istinct color and/or a of discharge is significant of normal flow in receiving s to be having a ream.	nping (bulk)       Excessi         k Erosion       Other:         gation       Stream daylighting         it       Other:         existing vegetation:	ive Sedimentation  g  Local stream repair/o  g Slope:  nd odorless. If the e amount of the stream's base inor / localized.  Outfall does i of causing ar	not have dry v aining; or app ny erosion pro



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And the second	CHID: WROY	TIME: 7:52			D: (Camera-Pic		/#/, 🤅	
SITE ID: (Con	dition-#) SC- <u>O</u> LAT	41.051 .7.5	" LONG /_	2022 !	<u>42.8</u> " LI	<u>ИК</u>	GPS (Ur	ıit ID)
TYPE: Roa					<u> </u>		0.1	
IIIE. MAD		# BARRELS:	I		Geological Form			
	SHAPE:	# BARRELS:	MATERIAL:		NMENT:	DIMENSI Barrel dia	ONS: ( <i>if varial</i> neter: イ・	
	Box Box Elliptical	Double Double	Metal		t flow-aligned		Height:	(ft)
FOR ROAD/ RAILROAD	Circular Other:	Triple	Other:		not know			(II)
CROSSINGS	<b>CONDITION:</b> (Evidence of)		L	Curr		Culvert ler	ngth: 6	∂(ft)
ONLY	Condition (Evidence of)	n 🗌 Downstrean	a coour bolo		<b>ERT SLOPE:</b>		Width:	(ft)
	Sediment deposition	Failing emb		🔲 Sli	ght $(2^{\circ} - 5^{\circ})$			
	Other ( <i>describe</i> ):			ОЪ	vious (>5°)	Roadway	elevation:	50_(ft)
					L			
	RESTORATION CANDIDATE	Fish barrier re				-	0	
no		Local stream 1				Remar	Pulum 2	rve
IS SC ACTING	G AS GRADE CONTROL		es 🗌 Unkn		storting to			
	EXTENT OF PHYSICAL BLC	OCKAGE:		BLO	CKAGE SEVER	ITY: (circl	e #)	
	Total Partial Temporary Unkno	wn	A structure such as		A total fish blocka		A temporary bar	
If yes for			road culvert on a 3 greater stream bloc		tributary that woul significant reach o		beaver dam or a the very head of	
fish barrier	CAUSE: Drop too high Water D	rop:(in)	upstream movemer	nt of	or partial blockage	e that may	very little viable	fish habitat
	Flow too shallow Water D	• • • • • •	anadromous fish; n passage device pre		interfere with the r anadromous fish.	nigration of	above it; natural as waterfalls.	barriers such
<u>```</u>	Other:		5		4 3		2	1
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Stream Crossing SC

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WATERSHED		RESERVOIT		DATE: (			ESSED BY: Fril	
- Freezen en e	CHD: WROY	<u>Тіме: 9:23</u>			<b>D:</b> (Camera-Pic	: #)	<u>/# 9,10</u>	
SITE ID: (Con	dition-#) SC- <u>0</u> み LAT	410 51 13	<u>.3_" Long 7</u>	12025	<u>'45.3"</u> LI	мк	GPS (Unit I	D)
Turn. Dr		· □		~	1a	. —		
TYPE: M Roa			1		Geological For		Other:	
For Road/ Railroad	SHAPE: Arch Bottomless Box Elliptical Circular Other:	# BARRELS: Single Double Triple Other:	MATERIAL:	□ F □ N	GNMENT: low-aligned ot flow-aligned to not know	Barrel dia	Height:	(ft) (ft)
CROSSINGS ONLY	CONDITION: (Evidence of)	on 🗌 Downstream	n scour hole vankment	F	VERT SLOPE: lat light (2° – 5 ⁰ ) bvious (>5°)	Culvert le	ength: Width:	(ft) (ft) (ft)
						Roadway		(It)
🗌 no	RESTORATION CANDIDATE	☐ Fish barrier re ☐ Local stream r	repair 🗌 Oth	er:	eplacement 🔲 l	Jpstream s	torage retrofit	
15 SC ACTING				nown	OCKAGE SEVEF		1. U)	
If yes for fish barrier	EXTENT OF PHYSICAL BLA Total Partial Temporary Unknow CAUSE: Drop too high Water I Flow too shallow Water I Other:	own Drop:(in)	A structure such road culvert on a greater stream bi upstream movern anadromous fish passage device p	as a dam or 3rd order or locking the nent of ; no fish present.	A total fish blocka tributary that woul significant reach o or partial blockage interfere with the anadromous fish.	ge on a Id isolate a of stream, e that may	A temporary barrier beaver dam or a blo the very head of a si very little viable fish above it; natural bar as waterfalls.	ckage at tream with habitat
NOTES/SKET			5		4 3		2 1	
ć	······································				REPOR	TED TO AU	THORITIES 🗌 YE	s 🗌 No

Art#I • SI · //I · W       Lox 71 • SI · //I				R	Reach Level A	ssessment	RCH	
TARE       Time: 1/2.22.AM/(20)       LMK:       END       Time: 2.153_M(20)       LMK:       GPS ID:         Artifio: 51: //16:       Low 71: 0.51: //16:       Lwrft 0.51: //16:       Lwrft 0.51: //16:       Lwrft 0.51: //16:       GPS ID:         BACKLERTION:       Clock //26: //26:       Lwrft 0.51: //16:       Lwrft 0.5:	SURVEY REACH	D: <u>1205</u> WT	ashd/Subshd: Wa	Ikus Res	DATE:			
ESCRIPTION:       Pack-Agends of Column       DESCRIPTION:       The Strady rain       DESCRIPTION:         AIN IN LAST 24 JUDUES       Intermittent       Trace       Overcast       Partly cloudy         INFORMATIONS LAND USE:       Intermittent       Trace       Overcast       Partly cloudy         (IRROUNDING LAND USE:       Intermittent       Commercial       Uthat/Residential & Suburban/Res       Covercast       Partly cloudy         (IRROUNDING LAND USE:       Intermittent       Covercast       Partly cloudy       Covercast       Partly cloudy         (IRROUNDING LAND USE:       Intermittent       Covercast       Covercast       Partly cloudy         (IRROUNDING LAND USE:       Intermittent       Covercast       Stade Clear       Covercast       Fract Nack State         (IRROUNDING LAND USE:       Intermittent       Covercast       Track clouding and life or all stic tomacts         (IRROUNDING LAND USE)       Covercast       Track clouding and life or all stic tomacts       State clouding:       State clouding:       State clouding:       State clouding:       State clouding:       State clouding:       Covercast       Track clouding:       State clouding:       Covercast       Track clouding:       Covercast       Track clouding:       Covercast       Track clouding:       Covercast       Track cloudin	START TIM				5 : 43 AM/PM			-
AN IN NAST 24 HOURS       Heavy rain       Steady rain       PRESENT CONDITIONS       Heavy rain       Intermittent         Proce       Intermittent       Trace       Colear       Trace       Overcast       Partly cloudy         CREDOUNDING LAND USE:       Industrial       Commercial       Uthon/Residential & Stabuthan/Res       Epersteel       Institutional         CREDOUNDING LAND USE:       Industrial       Commercial       Uthon/Residential & Stabuthan/Res       Epersteel       Institutional         CREDOUNDING LAND USE:       Industrial       Commercial       Uthon/Residential & Stabuthan/Res       Epersteel       Institutional         CREACH SKETCH AND STE INFACT       Exactly Stabuthan/Res       Stabuthan/Res       Epersteel       Institutional         Stabuthan/Stabuthan	LAT41 º 51 '	07.8" LONG 7	20 25 142.8"	LAT 41 ° 51 '	14.6 " LONG ]	2 ° 25 ' 36	2"	
Mone       Intermittent       Trace       Overcast       Party cloudy         CRROUNDING LAND USE:       Industrial       Commercial       Urban/Residential       Suburban/Res       Morestel       Institutional         CRROUNDING LAND USE:       Industrial       Commercial       Urban/Residential       Suburban/Res       Morestel       Institutional         AVERAGE CONDITIONS (check applicable)       REACH SKETCH AND SITE IMPACT TRACKING         ANNEL WIDTH       25-50 %       50%-75%       Suburban/Res Of Survey reach. Track Social and and and additional for all use impacts that the surger predent (DT ER, IS, ISC, UT, TR. M) as well ite impacts that the surger predent (DT ER, IS, ISC, UT, TR. M) as well and y additional for all use mand additional for all use mander additional for all use mander and the surger additional for all use mander and the surger additional for all use mander additin form all use mander additin form additional for all	DESCRIPTION: Dec	sch Hernis ist	crivet	DESCRIPTION:	84 ONTAMP DO	we cultert		
CRROUNDING LAND USE:       Industrial       Commercial       Urban/Residential       Suburban/Res       Grosted       Institutional         AMERAGE CONDITIONS (check applicable)       Crop       Pasture       Storter:       Urban/Residential       Suburban/Res       Crosted       Institutional         AMERAGE CONDITIONS (check applicable)       Crop       Pasture       Storter:       Urban/Residential       Suburban/Res       Crosted       Institutional         Storter:       Urban/Residential       Control       Storter:		-	•		•	-		
AVERAGE CONDITIONS (meck applicable)       REACH SKETCH AND SITE IMPACT TRACKING         ASE FLOW AS %       0-25%       50%-75%         ANNEL WITH       25-50 %       X(75-100%)         Simple planar michol of graves reach. The download the impact and any additional constraints of graves reach. The download of graves reach. The d								-
AVERAGE CONDITIONS (check applicable)       REACH SKETCH AND SITE IMPACT TRACKING         ASE FLOW AS %       0.25%       50%-75%         ANNEL WIDTH       125-50%       \$075-100%         ONNANT SUBSTRATE       50%-75%         Siluclay (fine or slick)       0.00ble (2.5-10°)         Boulder (>10°)       Boulder (>10°)         Gravel (0.1-2.5°)       0         Boulder (>10°)       Boulder (>10°)         Gravel (0.1-2.5°)       0         Optimum Street Market       0.00 paque (milky)         Other (chemicals, dyes)       0.00 paque (milky)         Internet in organise Go there: (check = 25%)       0.00 paque (milky)         Unknown       Bed secour       Stope failure         Internet in organise       0.00 stope failure         Internet in organise       0.00 stope failure         Internet in organise       0.00 stope failure         Internet in organise	DOM COMDING LAN							
ASE FLOW AS % 0-25% 00%-75% 0075-10% 00 INFAT CLASS 0 % 075-10% 00 INFAT CLASS 0 % 00 INFAT C	AVERAGE	CONDITIONS (chec	k applicable)	REACH	SKETCH AND SI		$\sim$	
HANNEL WIDTH $\Box 25-50 \%$ $\Box (75-100\%)$ OMINANT SUBSTRATE $\Box (A) = A = A = A = A = A = A = A = A = A =$	BASE FLOW AS %	0-25%	□ 50%-75%	Simple planar sketch	of survey reach. Tra	ack locations and IL	os for all site impacts	<u>*</u>
ONINARY SUBSTRATE       C. 4.4         ONINARY SUBSTRATE       C. 4.4         Converting       Cobble (2.5-10°)         Standed (cien or slick)       Dobble (2.5-10°)         Gravel (0.1-2.5")       Ded rock         ATER CLARITY       Sclear Claring (suspended matter)         I Stained (cien, naturally colored)       Opaque (milky)         OUNTIC PLANTS       Attached:       none         Floating:       Gravel       Opaque (milky)         OUND STREAM       Floating:       Gravel       Stree         Mostly shaded (225%)       Deer       Stree       Stree         Unknown       Agranding       Bank failure       Bank scour       Stree         VNAMICS       Widening       Bank scour       Stree       Stree         Unknown       Agranding       Stope failure       Stope failure         J Unknown       Sed. deposition       Channelized       Mile Bottom       Mile Bottom         Mostly states and and states       Stope failure       Stope failure       Stope failure         Unknown       Sed. deposition       Difficult Must cross, or sensitive areas to get to stock areas       Stope failure         Widthi       Bottom       Mile Stope failure       Stope failure       Stope failure<	CHANNEL WIDTH			within the survey re	each (OT, ER, IB,SC,	UT, TR, MI) as we	ll as any additional	
Shifteday (time or sinck)          Ucbobile (22-10") Boulder (>10") Gravel (0.1-2.5")          Boulder (>10") Gravel (0.1-2.5")          Bed rock          ArtER CLARITY          Generative colored)          Opage (>10") Stained (ciert, naturally colored)          Staine (>10") Stained (>25% coverage) Haftway (>25%)         Inter (seemics)          Mostly shaded (>25% coverage) Haftway (>25%)          Haftway (>25%)         Iten (=10)          Mostly shaded (>25%) Unshaded (<25%)		States 5	in too	ng /2	1 Kal	. maicale alrection	יט ווטא 🗸	
Gravel (0.1-2.5")       Bed rock         /ATER CLARITY       Clear       Turbid (suspended matter)         IS Stated (clear, naturally colored)       Opaque (milky)         Other (chemicals, dyes)       anone       some lots         STREAM       Floating:       S-aone       lots         STREAM       Floating:       S-aone       lots         /IDDLIPE IN OR       Chidence of %c-3k-4 kerger       Spear       Spear         /IDDLIPE IN OR       Mostly shaded (255%)       Pertially shaded (255%)       State of the constant of the const	☐ Silt/clay (fine or ⊠ Sand (gritty)				Star X			1
Other (chemicals, dyes)         QUATIC PLANTS         Attached:       Inone         STREAM       Floating:         Floating:       Shone         STREAM       Floating:         Civience of \$66^2/with McDer         Shift       Beaver         Shift       Shift         Civience of \$66^2/with McDer         Shift       Beaver         Other:       Fair:         Partially shaded (>25%)         Hannel       Beak failure         Bank scour         Widening       Bank scour         Bank scour       Channetized         HANNEL       Height:       LT bank         Rich       C.4         Width:       Bottom         Micht       C.1         Mensions       RT bank         Action       Seed. deposition         Micht:       Seed. deposition      <				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			acres	
Other (chemicals, dyes)         QUATIC PLANTS         Attached:       none         STREAM       Floating:         Floating:       Shone         STREAM       Snails         Mostly shaded (275%, coverage)         Snails       Mother:         Attached:       Downcutting         Presamily       Bank court         Mostly shaded (25%)       Partially shaded (25%)         Interview       Partially shaded (25%)         Unshaded (<25%)	WATER CLARITY	AClear DTurbid	(suspended matter)	-	6	A. PC	pren	
Other (chemicals, dyes)         QUATIC PLANTS         Attached:       Inone         STREAM       Floating:         Floating:       Shone         STREAM       Floating:         Civience of \$66^2/with McDer         Shift       Beaver         Shift       Shift         Civience of \$66^2/with McDer         Shift       Beaver         Other:       Fair:         Partially shaded (>25%)         Hannel       Beak failure         Bank scour         Widening       Bank scour         Bank scour       Channetized         HANNEL       Height:       LT bank         Rich       C.4         Width:       Bottom         Micht       C.1         Mensions       RT bank         Action       Seed. deposition         Micht:       Seed. deposition      <				× 165	AN CONTRACT	Stor		
STREAM       Floating:       Same       Isome				Nichell		an a		
AlLDLIFE IN OR ROUND STREAM       Evidence of Stream       Stream       Evidence of Stream         Snails Ed Other:       Channel 2000       Stream       Stream       Stream         Mostly shaded (25%)       Haftway (250%)       Haftway (250%)       Haftway (250%)         Instance       Partially shaded (225%)       Haftway (250%)       Haftway (250%)         HANNEL       Downcutting       Bank failure       Bank failure         YNAMICS       Widening       Bank scour       Stope failure         Unknown       Aggrading       Stope failure       Stope failure         Channelized       Top       1/4 5 (ft)       Hoots to steam         Mostly Brack ACCESSIBULITY       Width: Bottom       1/4 5 (ft)         NWSTREAM       Fair: Forested or developed area adjacent to stream. Smail or distan from stream, smail or distan from stream, smail or distan from stream, smail or distan from stream, stream       Difficult. Must cross welland, steep slope, or andscaped areas. Specialized heavy equipment using sting roads or trails       Specialized heavy geuipment required.         5       4       3       2       4	AQUATIC PLANTS	Attached: none	Ø⊈some □ lots	J. N.S. In	Nr. Br.	<u></u>	1	ļ
ROUND STREAM	IN STREAM	Floating: Anone	□ some □ lots		۱. ⁻			
ROUND STREAM	WILDLIFE IN OR	(Evidence of) Stead	Blue heron	1 X V	<b>N</b>			
FREAM SHADING       Mostly shaded (275% coverage)         Halfway (250%)       Partially shaded (225%)         Unshaded (<25%)	AROUND STREAM	I Fish ∐ Beave	r 🔄 Deer	.51	and the second sec		5622	
FREAM SHADING       Halfway (>50%)         Patrially shaded (>25%)         Unshaded (<25%)	·			1 <i> 1</i> ).	1. month	1	STE	
Unshaded (<25%)	STREAM SHADING	☐ Halfway (≥50%)	-	1 st	ALEE DUBAT	11	Sit perced	
HANNEL       Downcutting       Bed scour         WMAMICS       Widening       Bank failure         Widening       Headcutting       Bank failure         Unknown       Aggrading       Slope failure         Unknown       Sed. deposition       Channelized         HANNEL       Height: LT bank       2.4         HANNEL       Height: LT bank       2.1         MENSIONS       RT bank       2.1         MWNSTREAM()       Width: Bottom       11.6         Top       7.4       (ft)         Workple materials, system channel       Fair: Forested or developed area and/or located a great distance from stream. small or distant from stream.       Sec alized heavy equipment required.         Stange of trails.       3       2       1	(water surface)			1 / Laron	yes -	SOME	- Steep.	
NAMICS       Widening       Bank failure         YNAMICS       Headcutting       Bank failure         Unknown       Aggrading       Slope failure         Unknown       Slope failure       Channelized         HANNEL       Height: LT bank       2.4       (ft)         MENSIONS       RT bank       2.1       (ft)         ACING       Width: Bottom       11.6       (ft)         Diffecult Nust cross       wetland, steep slope, or digacent to stream.       Step slope, or specific areas to get to stockpile areas to get distance from stream.       Specialized heavy equipment required.         Stockpile areas       Small or distant from stream.       Specialized heavy equipment required.       State of theavy equipment required.         State of theavy       3       2       1		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			J 3 (	1 - 50500	
Invinces       Headcutting       Bank scour         Unknown       Aggrading       Slope failure         MANNEL       Sed. deposition       Slope failure         MANNEL       Height: LT bank       2.4       (ft)         MENSIONS       RT bank       2.1       (ft)         ACING       Width: Bottom       11.6       (ft)         DWNSTREAM)       Fair: Forested or       developed area         diacent to stream.       Access requires tree       Difficult. Must cross         wetand, steep slope, or       sensitive areas to get to       stockpile areas         sockpile materials, sy stream channel       Stockpile areas       Difficult Must cross         gisting roads or trails.       Stockpile areas       and/or located a great         sting roads or trails.       Stockpile areas       small or distant from stream.         sting roads or trails.       Stockpile areas       Stockpile areas         sting roads or trails.       4       3       2         5       4       3       2       1	CHANNEL			1. A BATTER			la 64	
Unknown       Aggrading       Slope failure         Unknown       Sed. deposition       Channelized         HANNEL       Height: LT bank       2.4       (ft)         IMENSIONS       RT bank       2.1       (ft)         ACING       Width: Bottom       11.6       (ft)         MENSIONS       RT bank       2.1       (ft)         ACING       Width: Bottom       11.6       (ft)         Top       14.5       (ft)       Strip         Mensions       Fair: Forested or dijacent to stream, scopile materials, sy stream channel cess for heavy sting roads or trails       Difficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile areas small or distant from stream.       Difficult agreat distance from stream. Specialized heavy equipment required.       No       Constitute       Constitute         5       4       3       2       1       1       1       1	DYNAMICS			Sc. With Stall	1 CATADA			
HANNEL       Height: LT bank       2.4       (ft)         IMENSIONS       RT bank       2.1       (ft)         ACING       Width: Bottom       11.6       (ft)         MMNSTREAM)       Width: Bottom       11.6       (ft)         No       Construction       11.6       (ft)	Unknown	Aggrading	Slope failure		t. as assist			
HANNEL       Height: LT bank       2.1       (ft)         IMENSIONS       RT bank       2.1       (ft)         MACING       Width: Bottom       11.6       (ft)         ACING       Width: Bottom       11.6       (ft)         Top       14.5       (ft)         REACH ACCESSIBILITY       Difficult. Must cross         wod: Open area in blic ownership, fficient room to ckpile materials, sy stream channel cess for heavy uipment using sting roads or trails.       Difficult Must cross         sy stream channel cess for heavy uipment using sting roads or trails.       Sockpile areas sto stockpile available and/or located a great distance from stream. Specialized heavy equipment required.       Specialized heavy equipment required.         5       4       3       2       1		🔀 Sed. deposition	Channelized					
IMENSIONS       RT bank       2.1       (ft)         ACING DWNSTREAM)       Width: Bottom       11.6       (ft)         No       Top       14.5       (ft)         Top       14.5       (ft)         REACH ACCESSIBILITY       Difficult. Must cross wetland, steep slope, or sensitive areas to get to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.       Difficult. Must cross wetland, steep slope, or sensitive areas to get to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.       Difficult areas small or distant from stream.       Of a periodic areas       Difficult areas small or distant from stream.	CHANNEL	Height: LT bank	<u>2.4</u> (ft)	22%	- Der	and the second		
Top       Image: Top       Top       Top       Image: Top	DIMENSIONS	RT bank	(n)	and the state of t	WC TRY	1-02- in	LAND BUNKS	
Reach Accessibility         pod: Open area in blic ownership, fficient room to bockpile materials, sy stream channel cess for heavy uipment using sting roads or trails.       Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.       Difficult. Must cross wetland, steep slope, or sensitive areas to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.       Difficult. Must cross wetland, steep slope, or sensitive areas to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.       Difficult. Must cross wetland, steep slope, or sensitive areas to stockpile available distance from stream. Specialized heavy equipment required.       Difficult. Must cross wetland, steep slope, or sensitive areas to stockpile available distance from stream. Specialized heavy equipment required.	(Facing downstreaM)	Width: Bottom			4 Jun I	0.001		t t
Reach Accessibility         pod: Open area in blic ownership, fficient room to bockpile materials, sy stream channel cess for heavy uipment using sting roads or trails.       Fair: Forested or developed area adjacent to stream. Access requires tree removal or impact to landscaped areas. Stockpile areas small or distant from stream.       Difficult. Must cross wetland, steep slope, or sensitive areas to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.       Difficult. Must cross wetland, steep slope, or sensitive areas to stockpile available and/or located a great distance from stream. Specialized heavy equipment required.       Difficult. Must cross wetland, steep slope, or sensitive areas to stockpile available distance from stream. Specialized heavy equipment required.       Difficult. Must cross wetland, steep slope, or sensitive areas to stockpile available distance from stream. Specialized heavy equipment required.	······································	Тор	<u>_/4,5</u> (ft)	/ / gut polis	N. A.	S. I	1 Vine	
developed area blic ownership, fficient room to cockpile materials, sy stream channel cess for heavy uipment using sting roads or trails.	R	A REAL PROPERTY AND A REAL			Steeler	Mr. BUL	aler and the second secon	1 L Bre
adjacent to stream. Access requires tree removal or impact to stream. 5 (4) 3 2 1 adjacent to stream. Access requires tree removal or impact to stream. Sensitive areas to get to stream. Few areas to stockpile available and/or located a great distance from stream. Specialized heavy equipment required. Stockpile available and/or located a great distance from stream. Specialized heavy equipment required.	Good: Open area in			15 15 1	No C	< / . · · · · · · · · · · · · · · · · · ·	1. sets	de la
ckpile materials,       insecting indicates and interval of impact to landscaped areas.         sy stream channel cess for heavy uipment using isting roads or trails.       indicate areas.         5       4       3       2       1	sufficient room to	adjacent to stream.	sensitive areas to get to		1	158- 304	10St Across	Barpa
cess for heavy uipment using isting roads or trails. 5 (4) 3 2 1 Construction of the areas and/or located a great distance from stream. Specialized heavy equipment required. 5 (4) 3 2 1	stockpile materials,				60 T ** ^{C X}	Sier -		1710
upment using sting roads or trails. 5	access for heavy	landscaped areas.	and/or located a great			hilling /	1	
$\frac{1}{5} \begin{pmatrix} 4 \\ 4 \end{pmatrix} = 3  2  1  5  4  3  2  1  5  4  4  4  4  4  4  4  4  4$	equipment using	· · · · · · · · · · · · · · · · · · ·		5-1354	(W	•	10360092	1. 
		stream.		ZU. 58	_	A		
Churches Wheet min's t			each) , r	7	<u> </u>	• • ) ~	1	-
Detro by self nou	)		L'INIT -	by Weat minis	; * b			
			better	0 10 W 00				
$\mathbf{Reported to authorities} \square Yes \square No$				An Mrs.	Repor	TED TO AUTHORI		

	Optimal	Suboptimal	Marginal	Poor
IN-STREAM HABITAT (May modify criteria based on appropriate habitat regime)	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well- suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; la of habitat is obvious; substrate unstable or lacking.
	20 19 18 17 16	15 14 (13 )2 11	10 9 8 7 6	5 4 3 2 1 0
VEGETATIVE PROTECTION (score each bank, determine sides by facing downstream)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambar surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetati has been removed to 5 centimeters or less in average stubble height.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
BANK EROSION (facing downstream)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Grade and width stable; isolated areas of bank failure/erosion; likely caused by a pipe outfall, local scour, impaired riparian vegetation or adjacent use.	Past downcutting evident, active stream widening, banks actively eroding at a moderate rate; no threat to property or infrastructure	Active downcutting; tall banks or both sides of the stream eroding a fast rate; erosion contributing significant amount of sediment t stream; obvious threat to proper or infrastructure.
	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	Right Bank 10 9	8 7 6	5 4 3	2 1 0
FLOODPLAIN CONNECTION	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) able to enter floodplain. Stream not deeply entrenched.	High flows (greater than bankfull) not able to enter floodplain. Stream deeply entrenched.	High flows (greater than bankful not able to enter floodplain. Stream deeply entrenched.
	AND THE REPORT OF A REAL PROPERTY OF A REAL	15 14 13 12 11 ALL BUFFER AND FLOODPLAI	10 9 8 7 6	5 4 3 2 1 0
<u></u>	Optimal	Suboptimal	Marginal	Poor
Vegetated Buffer Width	Width of buffer zone >50 feet; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, crops) have not impacted zone.	Width of buffer zone 25-50 feet; human activities have impacted zone only minimally.	Width of buffer zone 10-25 feet; human activities have impacted zone a great deal.	Width of buffer zone <10 feet: lit or no riparian vegetation due to human activities.
				2 1 0
	Left Bank 10 9	8 (7) 6	5 4 3	
	Left Bank         10         9           Right Bank         10         9	<u>8</u> (7) 6 <u>8</u> 7 6'	5 4 3	2 1 0
	Right Bank     10     9       Predominant floodplain vegetation type is mature forest	8 7 6 Predominant floodplain vegetation type is young forest	5 4 3 Predominant floodplain vegetation type is shrub or old field	2 1 0
	Right Bank       10       9         Predominant floodplain vegetation type is mature forest       20       19       18       17       16	8     7     6'       Predominant floodplain vegetation type is young forest     15     14       15     14     13     12     11	543Predominant floodplain vegetation type is shrub or old field010987	2 1 0 Predominant floodplain vegetation
VEGETATION Floodplain	Right Bank     10     9       Predominant floodplain vegetation type is mature forest	8 7 6 Predominant floodplain vegetation type is young forest	5 4 3 Predominant floodplain vegetation type is shrub or old field	2 1 0 Predominant floodplain vegetation type is turf or crop land
VEGETATION FLOODPLAIN	Right Bank       10       9         Predominant floodplain vegetation type is mature forest       20       19       18       17       16         Even mix of wetland and non-wetland habitats, evidence of standing/ponded	8 7 6 Predominant floodplain vegetation type is young forest 15 14 13 12 11 Even mix of wetland and non-wetland habitats, no evidence of	5     4     3       Predominant floodplain     vegetation type is shrub or old field       10     9     8     7     6       Either all wetland or all non-wetland habitat, evidence of standing/ponded water     10     9     8     7     6	2 1 0 Predominant floodplain vegetation type is turf or crop land 5 4 3 2 1 0 Either all wetland or all non- wetland habitat, no evidence of
FLOODPLAIN VEGETATION FLOODPLAIN HABITAT FLOODPLAIN ENCROACH- MENT	Right Bank       10       9         Predominant floodplain vegetation type is mature forest       20       19       18       17       16         20       19       18       17       16         Even mix of wetland and non-wetland habitats, evidence of standing/ponded water	8 7 6' Predominant floodplain vegetation type is young forest 15 14 13 12 11 Even mix of wetland and non-wetland habitats, no evidence of standing/ponded water	5     4     3       Predominant floodplain     vegetation type is shrub or old field       10     9     8     7     6   Either all wetland or all non-wetland habitat, evidence of standing/ponded water	2     1     0       Predominant floodplain vegetation     type is turf or crop land       5     4     3     2     1     0       Either all wetland or all non-wetland habitat, no evidence of standing/ponded water

[		-			Storm Water	r Outfalls	ΟΤ
WATERSHED/SUBSHEI		Lisuoiz		Date: <u>6 / 3</u>	/_0% Asse	SSED BY: 🏷	27,6k
JURVEY REACH ID: \		IME: <u>5</u> : <u>0</u> , AM/R		Рното ID: (Came	era-Pic #) &-1	3 /#	· · · · · · · · · · · · · · · · · · ·
SITE ID (Condition-#): O	T- <u>0 </u> L	AT <u>41° 51 11.5</u>	('' Lo	NG 72º 25 130	<u>?.]</u> " LMK	G	<b>PS:</b> (Unit ID)
BANK: LT RT Head FLOW: None Trickle Moderate	TYPE:	MATERIAL:	Metal Brick	SHAPE: Sin Circular De SHAPE: Sin Circular De SHAPE: Sin Sin Circular De Sin	ouble	SIONS: r:(in)	SUBMERGED:
Substantial	Open channel	Concrete DE Other:	arthen	<ul> <li>Trapezoid</li> <li>Parabolic</li> <li>Other:</li> </ul>	Depth: Width (Top):_ " (Bottom):_		NOT APPEICABLE
CONDITION: X None Chip/Cracked Peeling Paint	ODOR: NO Gas Sewage Rancid/Sour	DEPOSITS/STAINS		VEGGIE DENSITY D None Normal Inhibited	Brown Other:	NTHIC GROW	Green
Corrosion Other:	Sulfide	Paint Other:		Excessive Other:	Good 🗌	JALITY:	Colors Oils
FOR COLOR: FLOWING TURBIDI ONLY FLOATA	BLES: Non	e Slight Cloudine e Sewage (toilet )	ess 🗌	Cloudy Opaq	n 🗌 Orange 🗍 ue eum (oil sheen)	Red 🛄 Othe	
CONCERNS: Need	ss Trash (paper/pl s Regular Mainter	nance 🗌 Ba	umping ( ink Erosi	on 🔣 Other	ssive Sedimentation	null? Deer	
POTENTIAL RESTORAT	ION CANDIDAT	E 🛛 Discharge inves		Stream daylightin	ng 🗌 Local stre	eam repair/out	fall stabilization
If yes for daylighting:							
Length of vegetative cover	• from outfall:	ft Type of	of existin	g vegetation:		Slope:	°
If yes for stormwater:							
Is stormwater currently con			Jse descr	iption:	No		- 
Yes   No   Not in     OUTFALL   Heave	y discharge with a dis		vailable:				
SEVERITY: stron (circle #) strea	g smell. The amount o	f discharge is significant normal flow in receiving to be having a	discharge discharge	harge; flow mostly clear has a color and/or odor, f is very small compared to ny impact appears to be	the amount of o the stream's base	discharge; staini	have dry weather ing; or appearance prosion problems.
	5	4		(3)		2	1
SKETCH/NOTES:	Very De	up col ch		d throw States F y. Frush	h Re	siont	val
	propert	y. Dwn	er e	states p	no) wor	us Fr	j -ywg
\	- 1141g	should !	Spriv	y. Frish	culting	> 3	putunal
, )	1 alve	. ir cha	me		REPORTED TO	AUTHORITIES	: 🗌 YES 🗌 NO

WATERSHED/SUBSHE	D: 1./. 114. D	· Serviz	]	DATE: <u>6 / 3 / 4</u>	2 ASSES	SSED BV: `	JS, P.7, 0
SURVEY REACH ID:		ME: <u>5</u> : <u>25</u> AM/RN		PHOTO ID: (Camera-P		/#	<u>20, 1-1, 1</u>
SITE ID (Condition-#): O	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			DNG 72 ° 25 '40,1			GPS: (Un
		······					
BANK: LT ART Head FLOW: None Trickle	TYPE:	MATERIAL:	Metal Brick	SHAPE: Single Circular Double Elliptical Triple Other:		SIONS: r:(in)	SUBME SUBME No Parti
Moderate Substantial	Open channel	Concrete Ea	arthen		Depth: _ Width (Top):_ " (Bottom):		NOT APPI
CONDITION: None Chip/Cracked Peeling Paint Corrosion Other:	ODOR: DNO Gas Sewage Rancid/Sour Sulfide Other:	DEPOSITS/STAINS	S:	VEGGIE DENSITY: None Normal Inhibited Excessive Other:	Brown Other: POOL QU Good	UALITY: [	OWTH: ge Gree No pool Colors Floatable
	ess Trash (paper/pla ds Regular Mainten	<b>U</b> / <b>—</b>	umping	. ,	e Sedimentatio	2	Other:
CONCERNS: Need	ds Regular Mainten	ance Ba	umping ank Eros stigatior	(bulk) Excessive	e Sedimentatio	on	
CONCERNS:       Need         POTENTIAL RESTORATION       Need         M no       If yes for daylighting:         Length of vegetative cover	ds Regular Mainten	ance Ba	umping ank Eros stigatior ofit	(bulk)	e Sedimentatio	on	outfall stabi
CONCERNS:       Need         POTENTIAL RESTORATION       Need         Image: Inf yes for daylighting:       Need         Length of vegetative cover       If yes for stormwater:         Is stormwater currently cover       Is stormwater currently cover	ds Regular Mainten	ance Ba	umping ank Eros stigatior ofit of existi	(bulk)	e Sedimentatio	on eam repair/o	outfall stabi
CONCERNS:       Need         POTENTIAL RESTORATION       Need         Ino       If yes for daylighting:         Length of vegetative cover       If yes for stormwater:         Is stormwater currently co       Yes No         Yes       No         OUTFALL       Hea         SEVERITY:       corr         (circle #)       stre	ds Regular Mainten	ance Ba	umping ank Eros stigatior offt of existi Use desc available Small dis discharg discharg	(bulk)	e Sedimentatio	on eam repair/o Slope: Slope:  Outfall does discharge; s	'outfall stabi
ONCERNS:       Need         POTENTIAL RESTORATION       Need         Image: A state of the state of	ds Regular Mainten TION CANDIDATE TION CANDIDATE ontrolled? investigated avy discharge with a dist ing smell. The amount of pared to the amount of am; discharge appears i	ance Ba	umping ank Eros stigatior ofit of existi Use deso available Small dis discharg flow and	(bulk) Excessive sion Other: a Stream daylighting Other: ing vegetation: cription: e: scharge; flow mostly clear and of ge has a color and/or odor, the and ge is very small compared to the	e Sedimentatio	on eam repair/o Slope: Slope:  Outfall does discharge; s	'outfall stabi
CONCERNS:       Need         POTENTIAL RESTORATION       Need         Ino       If yes for daylighting:         Length of vegetative cover       If yes for stormwater:         Is stormwater currently co       Yes No         Yes       No         OUTFALL       Hea         SEVERITY:       corr         (circle #)       stre	ds Regular Mainten	ance Ba	umping ank Eros stigatior ofit of existi Use deso available Small dis discharg flow and	(bulk)       Excessive         sion       Other:         n       Stream daylighting         Other:       Other:         ing vegetation:	e Sedimentatio	on eam repair/o Slope: Slope:  discharge; s of causing a	outfall stabi
ONCERNS:       Need         POTENTIAL RESTORATION       Need         Image: A state of the state of	ds Regular Mainten	ance Ba	umping ank Eros stigatior ofit of existi Use deso available Small dis discharg flow and	(bulk)       Excessive         sion       Other:         n       Stream daylighting         Other:       Other:         ing vegetation:	e Sedimentatio	on eam repair/o Slope: Slope:  discharge; s of causing a	outfall stabi

Stream Crossing

WATERSHED	SUBSHED: Worken's	> Resevoir	D	ATE: 6	13108	ASSE	SSED BY: 35 27 6 A
URVEY REA		TIME: 5 : 47			: (Camera-Pic		/#
SITE ID: (Cor	udition-#) SC- <u>02</u> LAT					ИК	GPS (Unit ID)
The second second							
TYPE: ARO	ad Crossing 🔲 Railroad Crossi		1	1	Geological Form		Other:
For Road/ Railroad	SHAPE: Arch Bottomless Social Box Elliptical Circular Other:	# BARRELS: Single Double Triple Other:	MATERIAL: Concrete Metal Other:	∑ Flo	NMENT: ow-aligned t flow-aligned not know	Barrel dia	Height: $\frac{6.544 \text{ st}}{6.044}$ (ft)
CROSSINGS ONLY	CONDITION: (Evidence of)       Louis 6000         Cracking/chipping/corrosion       Downstream scour hole         Sediment deposition       Failing embankment         Other (describe):       Charles and the second seco			Ela Sli	<b>ERT SLOPE:</b> tt ght $(2^\circ - 5^\circ)$ vious (>5°)		ength:(ft) Width: $\underline{\neg ft \ et}_{(ft)}$ $\underline{\neg ft}_{Lt}$ elevation: $\underline{22}_{(ft)}$
POTÉNTIAL I	POTENTIAL RESTORATION CANDIDATE Local stream repair Other:			torage retrofit			
IS SC ACTIN	G AS GRADE CONTROL		es 🗌 Unknow	'n			
	EXTENT OF PHYSICAL BLO	CKAGE:		BLO	CKAGE SEVER	ITY: (circi	le #)
If yes for fish barrier	Total Partial Temporary Unknow CAUSE: Drop too high Water Dr Flow too shallow Water Dr Other:	op: (in)	A structure such as a road culvert on a 3rd of greater stream blockin upstream movement of anadromous fish; no fi passage device prese	order or g the of sh	A total fish blocka tributary that woul significant reach o or partial blockage interfere with the r anadromous fish.	d isolate a of stream, that may	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.
) NOTES/SKET			5	4	4 3		2 1
	. Et	sojo tien	10% Sedio	s Fron			THORITIES 🗌 YES 🗌 NO

Stream	Cros	sinc

Stream Crossing	SC
-----------------	----

								·····				
WATERSHED		Walkers	Reservoisz	A			13 108		ESSED BY: BWMA			
and the second	CHD: WR	CONVERSION OF A	TIME: 4:34	Street and			:(Camera-Pic	#) #7	/#			
SITE ID: (Con	dition-#) SC-	<u>01</u>   Lat (	41.051.09	12" LONG 2	<u>72°</u>	25 '	<u>41.4_" LN</u>	ИК	_ GPS (Unit ID)			
TYPE: NROE	ad Crossing	] Railroad Crossin	ng 🗌 Manmade	Dam 🗌 Beav	er Da	.m 🔲	Geological Forn	nation	] Other:			
For Road/ Railroad	SHAPE: Arch Box Circular Other:	Bottomless Elliptical	# BARRELS: Single Double Triple Other:	MATERIAL: Concrete Metal Other:		ALIGN Flo	NMENT: w-aligned t flow-aligned not know	DIMENS Barrel dia	Height: <del>7st Lk</del> (ft) 8.2.8+ MT			
CROSSINGS ONLY	Cracking/c	deposition Vin2	n Downstrear ゴ Failing emb	n scour hole pankment		🗶 Fla 🗌 Slig	ERT SLOPE: t ght $(2^\circ - 5^\circ)$ vious $(>5^\circ)$	Culvert le Roadway	ength:(ft) Width: $9 H G (ft)$ 9 H G (ft) 9 H G (ft) v elevation: $30$ (ft)			
POTENTIAL RESTORATION CANDIDATE       Fish barrier removal       Culvert repair/replacement       Upstream storage retrofit         No       Local stream repair       Other:												
IS SC ACTING	G AS GRADE (	CONTROL	No Y	es 🗌 Unk	nown	l			v			
EXTENT OF PHYSICAL BLOCKAGE: BLOCKAGE SEVERITY: (circle #)												
If yes for fish barrier	Total Temporar CAUSE: Drop too I Flow too s Other:	-	op: (in)	A structure such road culvert on a greater stream bl upstream movem anadromous fish; passage device p	3rd ord locking nent of ; no fisł	der or the	A total fish blockat tributary that woul significant reach c or partial blockage interfere with the r anadromous fish.	d isolate a f stream, e that may	A temporary barrier such as a beaver dam or a blockage at the very head of a stream with very little viable fish habitat above it; natural barriers such as waterfalls.			
) NOTES/SKET				5		4	3		2 1			
NOTES/SKET	CH:		A Sectoria	<i>v</i>	- Se		rip iop L L	275 0 2099.	t- bress grassmit			
							Report	FED TO AU	THORITIES 🗌 YES 🗌 NO			
			(1999)						transd			



#### APPENDIX B

### Upland Assessment Field Forms

## HSI

WATERSHED: ANKER	SUBWATERSHI	D: CAN	5	<b>UNIQUE SITE</b>	ID: 54	CB-HSI-2
DATE: 1 / 6 / 0g	ASSESSED BY:	FB, DB	CAMERA ID:		PIC#:	
MAP GRID:	LAT	<u>° 1</u>	'' Long°	1 11	LMK#	
A. SITE DATA AND BASIC CLASSIFICATION Name and Address: <u>No news</u> <u>Sound</u> , <u>an well</u> <u>Construction</u> <u>block</u>	Category:	☐ Institut ☐ Transp	ercial X Industrial ional Municipal ort-Related			
SIC code (if available): NPDES Status:		ription of O	peration: 7 of G1(& 61	ock		INDEX*
	V					
B. VEHICLE OPERATIONS N/A (Skip to				Observed I	ollution Sou	rce?
<b>B1.</b> Types of vehicles:  Fleet vehicles	School buses	Othe	••			
<ul><li>B2. Approximate number of vehicles:</li><li>B3. Vehicle activities (circle all that apply):</li></ul>	Maintained D	engined De	ovaled Eucled W	ashed Stored		0
<b>B4.</b> Are vehicles stored and/or repaired outs	and an and the second s	-		ashed Stored		
Are these vehicles lacking runoff diversion			Can't Tell			0
<b>B5.</b> Is there evidence of spills/leakage from	vehicles? 🗌 Y	□n 🙀	Can't Tell		A. 1. 4. 10 March 10, 11	0
B6. Are uncovered outdoor fueling areas pre-	esent? 🗌 Y 📋	]N 🔀 Cau	ı't Tell			0
B7. Are fueling areas directly connected to s		- 7	🗌 Can't Tell			0
<b>B8.</b> Are vehicles washed outdoors? Y Does the area where vehicles are washed dis			]Y []N 🛛 Car	n't Tell		O
C. OUTDOOR MATERIALS N/A (Skip to	) part D)			Observed I	Pollution Sou	rce?
<b>C1.</b> Are loading/unloading operations preser If yes, are they uncovered <i>and</i> draining towa	<b>N</b>			ı't Tell		0
<b>C2.</b> Are materials stored outside? X Where are they stored? grass/dirt area	N 🗌 Can't Tell	l If yes, are alt 🗌 bern	e they 🗌 Liquid 🔀 S ned area	Solid Description	n: Dict	(Ø)
C3. Is the storage area directly or indirectly	connected to sto	rm drain (cir	cle one)? 🗌 Y 📋	N 🚺 Can't Te		0
C4. Is staining or discoloration around the a	rea visible?	Y 🗌 N [	🛛 Can't Tell	/`		0
C5. Does outdoor storage area lack a cover?	Y N	🔀 Can't T	211			0
C6. Are liquid materials stored without seco	ndary containme	nt? 🗌 Y	N Can't Tel	1		0
C7. Are storage containers missing labels or	in poor conditio	on (rusting)?		an't Tell		0
D. WASTE MANAGEMENT 🗌 N/A (Skip t	o part E)			Observed I	Pollution Sou	
<b>D1.</b> Type of waste (check all that apply):	🗌 Garbage 🏼	Construction	materials 🗌 Hazar	rdous materials		0
<b>D2.</b> Dumpster condition ( <i>check all that app</i> evidence of leakage (stains on ground)	Overflowing	-		condition	eaking or	0
D3. Is the dumpster located near a storm dra If yes, are runoff diversion methods (be	rms, curbs) lacki			1		0
E. PHYSICAL PLANT N/A (Skip to part	F)	in en be		Observed I	Pollution Sou	rce?
E1. Building: Approximate age: 20 Evidence that maintenance results in discha			Clean Stai discoloration)? Y			0

## HSI

Surface material Paved/Concrete Gravel Permeable   Don't know None visible   Are downspouts discharge to impervious surface? Y   N Don't know   N Don't know   E4. Evidence of poor cleaning practices for construction activities (stains leading to storm drain)? F1. Wo of site with: Forest canopy % Turf grass % Landscaping % Bare Soil  % F2. Rate the turf management status: High Medium Low F3. Evidence of permanent irrigation or "non-target" irrigation Y N Can't Tell Can't Tell G. STORM WATER INFRASTRUCTURE N/A (skip to part H) Observed Pollution Source?													
F. TURF/LANDSCAPING AREAS       N/A (skip to part G)       Observed Pollution Source?         F1. % of site with: Forest canopy       % Turf grass       % Landscaping       % Bare Soil       %         F2. Rate the turf management status:       High       Medium       Low       O         F3. Evidence of permanent irrigation or "non-target" irrigation       Y       N       Can't Tell       O         F4. Do landscaped areas drain to the storm drain system?       Y       N       Can't Tell       O         F5. Do landscape plants accumulate organic matter (leaves, grass clippings) on adjacent impervious surface?       Y       N       Can't Tell													
F1. % of site with: Forest canopy% Turf grass% Landscaping% Bare Soil%       @         F2. Rate the turf management status:       High Medium Low       O         F3. Evidence of permanent irrigation or "non-target" irrigationY N Can't Tell       O         F4. Do landscaped areas drain to the storm drain system?       Y N Can't Tell       O         F5. Do landscape plants accumulate organic matter (leaves, grass clippings) on adjacent impervious surface? Y N Can't Tell       O													
F1. % of site with: Forest canopy% Turf grass% Landscaping% Bare Soil%       Bare Soil%         F2. Rate the turf management status:       High Medium Low       O         F3. Evidence of permanent irrigation or "non-target" irrigation Y N Can't Tell       O         F4. Do landscaped areas drain to the storm drain system?       Y N Can't Tell       O         F5. Do landscape plants accumulate organic matter (leaves, grass clippings) on adjacent impervious surface? Y N Can't Tell       O													
F2. Rate the turf management status:       High Medium Low       O         F3. Evidence of permanent irrigation or "non-target" irrigation Y N Can't Tell       O         F4. Do landscaped areas drain to the storm drain system?       Y N Can't Tell       O         F5. Do landscape plants accumulate organic matter (leaves, grass clippings) on adjacent impervious surface?       Y N Can't Tell       O													
F4. Do landscaped areas drain to the storm drain system?       Y       N       Can't Tell         F5. Do landscape plants accumulate organic matter (leaves, grass clippings) on adjacent impervious surface?       Y       N       Can't Tell													
F5. Do landscape plants accumulate organic matter (leaves, grass clippings) on adjacent impervious surface? Y N Can't Tell													
G. STORM WATER INFRASTRUCTURE N/A (skip to part H) Observed Pollution Source?													
G. STORM WATER INFRASTRUCTURE N/A (skip to part H) Observed Pollution Source													
G1. Are storm water treatment practices present? Y N M Unknown If yes, please describe: O													
G2. Are private storm drains located at the facility? Is trash present in gutters leading to storm drains? If so, complete the index below.													
Index Rating for Accumulation in Gutters													
Clean     Filthy       Sediment     1     2     3     4     5													
Organic material $\square$													
Litter 1 2 3 4 5													
G3. Catch basin inspection – Record SSD Unique Site ID here: Condition: Dirty Clean													
H. INITIAL HOTSPOT STATUS - INDEX RESULTS													
Not a hotspot (fewer than 5 circles and no boxes checked) Rotential hotspot (5 to 10 circles but no boxes checked)													
Confirmed hotspot (10 to 15 circles and/or 1 box checked) Severe hotspot (>15 circles and/or 2 or more boxes checked)													
Follow-up Action:													
Suggest follow-up on-site inspection													
Test for illicit discharge													
Include in future education effort													
Check to see if hotspot is an NPDES non-filer													
Pervious area restoration; complete PAA sheet and record													
Unique Site ID here:													
Schedule a review of storm water pollution prevention plan													
Notes:													
Follow needed - private industry													
pipes & debris in yaroi													
and large dirt piles while et.													
pipes & debris in yand and large dirt piles Sw practices unknown													

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7/16/08 TULWERE BROOK Mada brock Autohnisian - Hetrope opportunity . Joon montenence - alconort, odd forebay if nore Small DVI pipes directorying to V.S. signa times

### HSI

WATERSHED: Takker	SUBWATERSHED:	Unique Site	D: 172-HS1-0
DATE: <u>7/16/08</u>	ASSESSED BY: (B, DB C.	AMERA ID:	PIC#:
MAP GRID:		NG 72º 28 153"	LMK#
A. SITE DATA AND BASIC CLASSIFICATION			
Name and Address:	Category: Commercial Commercial	Industrial Miscellaneous Municipal Golf Course	
Highway Garage - CIDOT	Transport-Rela		
SIC code (if available):	Basic Description of Operation:		office
NPDES Status: Regulated	nct V Lorge garage	-, salt sand sto	Mg21 INDEX*
Unregulated Unknown B. VEHICLE OPERATIONS N/A (Skip to			
			ollution Source?
<ul><li>B1. Types of vehicles: Fleet vehicles</li><li>B2. Approximate number of vehicles:</li></ul>	School buses 🖸 Other: (Cu	<u>nmy</u>	
B3. Vehicle activities (circle all that apply):	Maintained Repaired Recycled	Fueled Washed Stored	
<b>B4.</b> Are vehicles stored and/or repaired outs		Thered washed Stored	0
Are these vehicles lacking runoff diversion r		ell	0
B5. Is there evidence of spills/leakage from	vehicles? 🗌 Y 🗌 N 🖾 Can't Te	ell	, O
B6. Are uncovered outdoor fueling areas pre	esent? X N Can't Tell	-	Ø
B7. Are fueling areas directly connected to s		n't Tell	Ø
<b>B8.</b> Are vehicles washed outdoors? Y Does the area where vehicles are washed dis			0
C. OUTDOOR MATERIALS N/A (Skip to		N Can't Tell	ollution Source?
C1. Are loading/unloading operations preser	nt? 💭 Y 🗌 N 🗌 Can't Tell		and a second
If yes, are they uncovered and draining towa	urds a storm drain inlet? 🗌 Y [	] N 🔄 Can't Tell	
<b>C2.</b> Are materials stored outside? X T Where are they stored? T grass/dirt area			- Fill grave 10
C3. Is the storage area directly or indirectly	connected to storm drain (circle one)	? 🗌 Y 🔲 N 🖾 (Can't Tel	
C4. Is staining or discoloration around the a	rea visible? 🗌 Y 🔲 N 🕅 Can't	Tell	0
C5. Does outdoor storage area lack a cover?	Y N Can't Tell		<u>کر</u>
C6. Are liquid materials stored without seco	ndary containment? 🗌 Y 🔲 N	🔀 Can't Tell	O
C7. Are storage containers missing labels or	in poor condition (rusting)? $\Box$ Y [	🗌 N 🛛 Can't Tell	0
D. WASTE MANAGEMENT N/A (Skip to	9 part E)	Observed P	ollution Source?
<b>D1.</b> Type of waste (check all that apply):	🛛 Garbage 🛛 Construction materia	als 🔲 Hazardous materials	0
<b>D2.</b> Dumpster condition ( <i>check all that app</i> evidence of leakage (stains on ground)	X Overflowing	maged/poor condition	eaking or
D3. Is the dumpster located near a storm dra If yes, are runoff diversion methods (ber		🔀 Can't Tell	O
E. PHYSICAL PLANT N/A (Skip to part i		Contract Contract of Contract of Contract	ollution Source?
E1. Building: Approximate age: 50	yrs. Condition of surfaces: 🗌 Cl		
Evidence that maintenance results in discha			

· 18

e.

# HSI

E2. Parking Lot: Approximate age <u>7</u> yrs. Condition: Clean Stained Dirty Breaking up Surface material Paved/Concrete Gravel Permeable Don't know													0						
E3. Do downspouts discharge to impervious surface? Y Are downspouts directly connected to storm drains?	N [		on'		low			ne v kno		e							1	0	
E4. Evidence of poor cleaning practices for construction activities										Y 🛛		τĽ	] Ca	ın't	Tel	1	. 1	0	
<b>F.</b> TURF/LANDSCAPING AREAS <b>N/A</b> (skip to part G)			÷.						Ob	serv	red	Poll	ntic	in S	Sou	rce	2		
F1. % of site with: Forest canopy $\textcircled{O}$ % Turf grass $\underline{\iota O}$ % L	andsc	api	ng _	$\bigcirc$	_%	Ba	re S	oil								City City		0	
F2. Rate the turf management status: High Medium	Low															- Polesters		0	
F3. Evidence of permanent irrigation or "non-target" irrigation	]Y [	N الک	1 [	]C	an'i	t Te	11 .										(	0	
F4. Do landscaped areas drain to the storm drain system?	₹Y		N		Ca	n't	Tell											0	
F5. Do landscape plants accumulate organic matter (leaves, grass clippings) on adjacent impervious surface? Y N Can't Tell															0				
G. STORM WATER INFRASTRUCTURE N/A (skip to part H) Observed Pollution Source													5-927-X 5ec 1	~	1 Statest				
G1. Are storm water treatment practices present?  Y X N Unknown If yes, please describe:														0					
G2. Are private storm drains located at the facility? Is trash present in gutters leading to storm drains? If so, complete the index below.														0					
Index Rating for Accumulation in Gutters Clean Filthy																			
Sediment 1 2	3					$\square$	4		Fl	ltny		5					<u></u>		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $							4					5							
Litter 1 2 3 4 5																			
G3. Catch basin inspection – Record SSD Unique Site ID here: Condition: Dirty Clean													1797 Y						
H. INITIAL HOTSPOT STATUS - INDEX RESULTS												ir - I							
Not a hotspot (fewer than 5 circles and no boxes checked) Confirmed hotspot (10 to 15 circles and/or 1 box checked)	<b>N</b>			-											,	ed)			
Follow-up Action:			1013																
Refer for immediate enforcement																			
Suggest follow-up on-site inspection Test for illicit discharge			_					-									_		
Include in future education effort																			
Check to see if hotspot is an NPDES non-filer																			
Onsite non-residential retrofit Pervious area restoration; complete PAA sheet and record																			
Unique Site ID here:				_							1								
Schedule a review of storm water pollution prevention plan																			
Notes:																			
Notes: CONV DOT Focility																			
Conne																			
		<u> </u>									ļ								
		ļ									<u> </u>	ļ							
											ļ	ļ				$\square$			

е

## HSI

WATERSHED: Makek	SUBWATERSHED: Walker	UNIQUE SITE ID: WR - HSI	-01							
$\mathbf{DATE:} \underline{7/16/08}$	ASSESSED BY: LB, DB CAMERA ID:	PIC#: 3808-3-	701							
MAP GRID:	LAT 41. 51 . 11 "LONG 72. 25	<u>.45</u> " LMK#								
A. SITE DATA AND BASIC CLASSIFICATION										
Name and Address: <u>FF 31 off of IS4</u>	Category: Commercial Industrial Institutional Municipal	Miscellaneous Golf Course Marina								
	Basic Description of Operation:	Animal Facility								
SIC code (if available): NPDES Status:	Dot Commuter Lot									
Unregulated Unknown		INDP	EX*							
B. VEHICLE OPERATIONS N/A (Skip to	part C)	Observed Pollution Source?								
B1. Types of vehicles: 🗌 Fleet vehicles	School buses Dother: Velnide Part	• Second strategy of the second strategy o								
B2. Approximate number of vehicles: 150										
	Maintained Repaired Recycled Fueled Wa	shed Stored Parking	٤							
<b>B4.</b> Are vehicles stored and/or repaired outs Are these vehicles lacking runoff diversion t			)							
<b>B5.</b> Is there evidence of spills/leakage from	vehicles? Y N N Can't Tell Provide	oil leaks/sediment >	۶ ا							
B6. Are uncovered outdoor fueling areas pre-	esent? 🗌 Y 🐹 N 🗌 Can't Tell	E/Salting/Sanding C	).							
B7. Are fueling areas directly connected to s		r. T C	)							
<b>B8.</b> Are vehicles washed outdoors? Y Does the area where vehicles are washed dis		rt Tell	)							
C. OUTDOOR MATERIALS 🖾 N/A (Skip to		Observed Pollution Source?								
C1. Are loading/unloading operations preserved			ý							
If yes, are they uncovered and draining towa		't Tell								
C2. Are materials stored outside? $\Box$ Y $\downarrow$ Where are they stored? $\Box$ grass/dirt area	N Can [*] t Tell / If yes, are they Liquid S concrete/asphalt bermed area	olid Description: C	)							
C3. Is the storage area directly or indirectly	connected to storm drain (circle one)? 🕅 Y 🔲 1	N 🗌 Can't Tell	)							
C4. Is staining or discoloration around the a	rea visible? 🗌 Y 🔣 N 📋 Can't Tell	C	)							
C5. Does outdoor storage area lack a cover?	☐Ý ☑N ☐ Can't Tell	C	)							
C6. Are liquid materials stored without seco	ndary containment? 🗌 Y 🗌 N 🗌 Can't Tell	C	)							
C7. Are storage containers missing labels or	in poor condition (rusting)?  Y N Ca	n't Tell	)							
D. WASTE MANAGEMENT 🖾 N/A (Skip t	o part E)	Observed Pollution Source?								
<b>D1.</b> Type of waste (check all that apply):	Garbage Construction materials Hazar	dous materials	)							
<b>D2.</b> Dumpster condition ( <i>check all that app</i> evidence of leakage (stains on ground)	ly):  No cover/Lid is open Damaged/poor co Overflowing	ondition Leaking or C	)							
D3. Is the dumpster located near a storm dra If yes, are runoff diversion methods (be		C	)							
E. PHYSICAL PLANT N/A (Skip to part		Observed Pollution Source?								
E1. Building: Approximate age: yrs. Condition of surfaces: Clean Stained Dirty Damaged										
Evidence that maintenance results in discha	rge to storm drains (staining/discoloration)?		)							

WR-451-01

### HSI

<b>E2.</b> Parking Lot: Approximate age <u>10</u> yrs. Condition: Cle Surface material <b>X</b> Paved/Concrete Gravel Permea		• •	g up	X								
E3. Do downspouts discharge to impervious surface?	N Don't kno	w 🗌 None visible	<u> </u>	0								
Are downspouts directly connected to storm drains? E4. Evidence of poor cleaning practices for construction activities	Y N	Don't know	□ N □ Can't Tell	O								
<b>F.</b> TURF/LANDSCAPING AREAS $\bigotimes$ N/A ( <i>skip to part G</i> )	, (sums rouding to	Television and the second	rved Pollution Source									
	andscaping %	6 Bare Soil %		Î O								
	Low			Ō								
<b>F3.</b> Evidence of permanent irrigation or "non-target" irrigation		n't Tell		O								
F4. Do landscaped areas drain to the storm drain system?	JY DN DO	Can't Tell		0								
F5. Do landscape plants accumulate organic matter (leaves, grass clippin	gs) on adjacent impe	ervious surface? 🔲 Y	N Can't Tell	0								
G. STORM WATER INFRASTRUCTURE N/A (skip to part H) Observed Pollution Source?												
G1. Are storm water treatment practices present? $\Box$ Y X N	] Unknown If yes	s, please describe:		X								
<b>G2.</b> Are private storm drains located at the facility? $\square$ N	Unknown			Ø								
Is trash present in gutters leading to storm drains? If so, o												
Clean Index Rating	for Accumulation	in Gutters Filtl	1V									
Sediment 1 2	⊠3	4										
Organic material $\Box 1$ $\Box 2$	3	4	5									
Litter     1     2       G3. Catch basin inspection – Record SSD Unique Site ID here:	Condit	<u> </u>	5 lean									
H. INITIAL HOTSPOT STATUS - INDEX RESULTS	Condit											
$\square$ Not a hotspot (fewer than 5 circles and no boxes checked)	Potential hotspot	(5 to 10 circles but	no boxes checked)									
Confirmed hotspot (10 to 15 circles and/or 1 box checked)	· -	•	•	d)								
Follow-up Action:												
Refer for immediate enforcement												
Suggest follow-up on-site inspection Test for illicit discharge		T II-	84 1									
Include in future education effort												
$\Box$ Check to see if hotspot is an NPDES non-filer												
Onsite non-residential retrofit Pervious area restoration; complete PAA sheet and record												
Unique Site ID here:												
Schedule a review of storm water pollution prevention plan		- Maryang										
Notes:		THUH!										
Siv runoff from parking lot												
Is all along will dowed		A A	24									
directly enters wetland area			2 ////									
& likely contains eil and												
Sediments & Salts. Retrofit												
possible with large buffer.			TACKP 1									
possible office for the s												
				Aliet and								
			Invasibele									
			Cat-Lil.	ding up								
	A-6		Maini	& Solue								
			- sn	along m/ # Some plantz								

e e e e e e

WR-4157-D] 1/16/06 Horsport Univerticar - 4105/ 11" 72° 25' 45" Dot commuter lot - WR. submatershed Droivage averland to SE corner Discharge to wetland Wide grass strip between cirb & wethout could be used for Swele PROPOSED: Existing: ξO curb-3 DOUBLE CB

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### HSI

WATERSHED: The dak	SUBWATERSHED: Gage	-5	UNIQUE SITE	ID: GB-HSI	-02			
DATE: 7 1161 08	ASSESSED BY: KING	CAMERA ID:		PIC#:				
MAP GRID:	LAT 410 51 30 "	LONG 72025	<u>.09</u> "	LMK#				
A. SITE DATA AND BASIC CLASSIFICATION								
Name and Address:		al 🛛 Industrial al 🗌 Municipal	Miscellaneous					
Davi Farms (ce Cream	- Transport-		Marina					
Distribution	- Desig Deservation of Oracus	<b>4:</b>	🗌 Animal Faci	lity				
SIC code (if available): NPDES Status: D Regulated	Basic Description of Opera Distribution (eu							
Unregulated Unknown	UISINDUINU (a		·····	[I	NDEX*			
B. VEHICLE OPERATIONS N/A (Skip to	part C)		Observed P	ollution Source?				
<b>B1.</b> Types of vehicles: M Fleet vehicles	School buses 🛛 Other: C	avs/mcles let						
B2. Approximate number of vehicles: 20	£	ster vehicles		· · · · · ·				
<b>B3.</b> Vehicle activities (circle all that apply)			shed Stored		Ø			
<b>B4.</b> Are vehicles stored and/or repaired outs Are these vehicles lacking runoff diversion			an an ann an Anna Anna an Anna an Anna An		0			
B5. Is there evidence of spills/leakage from					0			
B6. Are uncovered outdoor fueling areas pro	esent? Y X N Can't 7	rell			0			
<b>B7.</b> Are fueling areas directly connected to a	storm drains? 🖄 Y 🗌 N 🕅	Can't Tell piok			Ø			
B8. Are vehicles washed outdoors? Y N Can't Tell								
Does the area where vehicles are washed dis		N Can	't Tell		O I			
C. OUTDOOR MATERIALS N/A (Skip to			Observed P	ollution Source?				
<b>C1.</b> Are loading/unloading operations prese If yes, are they uncovered <i>and</i> draining towa			²+ Toll		0			
<b>C2.</b> Are materials stored outside? $\searrow$ Y								
Where are they stored? grass/dirt area	Concrete/asphalt bermed	area	ond Description	·	0/			
C3. Is the storage area directly or indirectly	connected to storm drain (circle o	one)? 🛛 Y 🔲 ]	N 🗌 Can't Tel	11	Ø			
C4. Is staining or discoloration around the a	rea visible? 🗌 Y 🔲 N 📈 C	Can't Tell			0/			
C5. Does outdoor storage area lack a cover?	Y N Can't Tell			21	Ø			
C6. Are liquid materials stored without seco	ndary containment? Y	N 🕅 Can't Tell			0			
C7. Are storage containers missing labels or	in poor condition (rusting)?	Y 🖾 N 🗌 Car	n't Tell		0			
D. WASTE MANAGEMENT N/A (Skip t	o part E)		Observed P	ollution Source?				
<b>D1.</b> Type of waste (check all that apply):	Garbage 🗌 Construction ma	nterials 🗌 Hazar	dous materials		0			
<b>D2.</b> Dumpster condition ( <i>check all that app</i> evidence of leakage (stains on ground)		Damaged/poor co	ondition □Le ・ ♪	eaking or	0			
<b>D3.</b> Is the dumpster located near a storm dra					0			
If yes, are runoff diversion methods (be		N 📝 Can't Tell			<u> </u>			
E. PHYSICAL PLANT N/A (Skip to part			Observed P	ollution Source?				
E1. Building: Approximate age:	yrs. Condition of surfaces:				0			
Evidence that maintenance results in discha	rge to storm drains (staining/disc	oloration)?		cnow .	0			

GBHS102

# HSI

E2. Parking Lot: Approximate age 7 yrs. Condition: A Clean Stained Dirty Breaking up Surface material Paved/Concrete Gravel Permeable Don't know														0						
E3. Do downspouts disch Are downspouts	arge to impervious s directly connected t		] и[ П	]D Y	on'i	t kno N	ow		Jone 1't k	visil 10w	ole						A COMPANY AND		Ø	
E4. Evidence of poor clea	ning practices for co	onstruction activitie	es (staii	ns le	adir	ng to	o sto	orm	lrain	)? [	] Y		N	X1	Can'	't Te	11		0	
F. TURF/LANDSCAPIN	GAREAS 🗌 N/A	(skip to part G)								0	bse	rve	d P	ollu	tion	Sou	irce	?[		
F1. % of site with: Forest	canopy% Tu	rf grass 🙀 %	Landsc	apii	1g <u> </u>	0	%	Bare	e Soi	1	_%								0	
F2. Rate the turf manager	nent status: 🕅 Hig	h 🗌 Medium 🛛	Low																0,	
F3. Evidence of permanen	nt irrigation or "non-	target" irrigation	<u>Х</u> Ү[	<u> </u> N	1 [	] Ca	an't	Tell										(	Ø	
F4. Do landscaped areas	drain to the storm dra	ain system?	ХÏҮ		N		Ca	n't T	ell										Ø	
F5. Do landscape plants acc	umulate organic matter	(leaves, grass clippi	ngs) on	adja	cent	t imp	berv	ious s	urfac	e? [	] Y	Ø	N		Can'	t Te	11		0	
G. STORM WATER INFRASTRUCTURE N/A (skip to part H) Observed Pollution Source														?_		10.00				
G1. Are storm water treatment practices present? Y N K Unknown If yes, please describe:													(	0						
G2. Are private storm drains located at the facility? X Y N Unknown No Is trash present in gutters leading to storm drains?/If so, complete the index below.													. (	0						
Index Rating for Accumulation in Gutters																				
Clean  Filthy    Sediment  1      1      2      3      4      5																				
Organic material		$\square 2$					ן ן					L	$\frac{1}{15}$							
$\begin{array}{c c c c c c c c c c c c c c c c c c c $																				
G3. Catch basin inspection – Record SSD Unique Site ID here: Condition: Dirty Clean												1000								
H. INITIAL HOTSPOT STATUS - INDEX RESULTS																				
Not a hotspot (fewer t		· · · · · · · · · · · · · · · · · · ·	•			_														
Confirmed hotspot (1	0 to 15 circles and/o	r 1 box checked)	Seve	ere h	ots	<u> 20t (</u>	<u>&gt;1:</u>	$\frac{5}{1}$ circ	les a	ind/o	r 2 c	or n	nore	box	tes c	hecl	ked)			
<b>Follow-up Action:</b>	nforcement												_							
Suggest follow-up on-									_											
Test for illicit discharg									_											
Include in future educ		G1																		
Check to see if hotspot		nier																		
Pervious area restorat		sheet and record																		
Unique Site ID I	nere:															1	1.			
Schedule a review of	storm water pollutio	n prevention plan															ŀ			
Notes:																				
													Τ							
1				1			1													

e C

### HSI

WA RSHED: Tank	SUBWATERSHED: Gages	UNIQUE SITE	ID:GB-HSI-01							
DATE: 7/16/08	Assessed By: $\angle \beta$ , $\nabla \beta'$ CAMERA ID:		PIC#: 3687							
MAP GRID:	LAT 41 . 51 . 38 "LONG 72 512	515"	LMK#							
A. SITE DATA AND BASIC CLASSIFICATION										
Name and Address: Industrial Park West	Institutional Municipal	Miscellaneous Golf Course Marina Animal Faci	llity							
SIC code (if available):	Basic Description of Operation: Office Buil	Iding - Ger	ber Technologies							
NPDES Status: Regulated	and the start of the for the for the start of the start o	CARBURAT	INDEX*							
B. VEHICLE OPERATIONS N/A (Skip to	nart ()									
<b>B1.</b> Types of vehicles:  Fleet vehicles			Pollution Source?							
<b>B2.</b> Approximate number of vehicles:		icres								
B2. Approximate number of vehicles: <u>50</u> (00 B3. Vehicle activities (circle all that apply): (Maintained) Repaired Recycled Fueled Washed Stored										
<b>B4.</b> Are vehicles stored and/or repaired outs										
Are these vehicles lacking runoff diversion	nethods? 🗍 Y 🗌 N 🗌 Can't Tell		• • • •							
<b>B5.</b> Is there evidence of spills/leakage from	vehicles? 🗌 Y 🔀 N 🗌 Can't Tell		0							
B6. Are uncovered outdoor fueling areas pre-	sent? 🗌 Y 🖾 N 🗌 Can't Tell		0							
<b>B7.</b> Are fueling areas directly connected to storm drains?  Y X N Can't Tell										
<b>B8.</b> Are vehicles washed outdoors? Y X Can't Tell Does the area where vehicles are washed discharge to the storm drain? Y N Can't Tell										
C. OUTDOOR MATERIALS X N/A (Skip to part D) Observed Pollution Source										
C1. Are loading/unloading operations preser	, •		0							
If yes, are they uncovered and draining towa		't Tell								
<b>C2.</b> Are materials stored outside? Y X Where are they stored? grass/dirt area	N Can't Tell If yes, are they Liquid So concrete/asphalt bermed area	olid Descriptior	^{n:} O							
C3. Is the storage area directly or indirectly	connected to storm drain (circle one)?	V 🗌 Can't Te	11 O							
C4. Is staining or discoloration around the a	rea visible? 🗌 Y 🔲 N 📈 Can't Tell		0							
C5. Does outdoor storage area lack a cover?	Y N Can't Tell		0							
C6. Are liquid materials stored without seco	ndary containment? 🗌 Y 🏹 N 🗌 Can't Tell	······	0							
C7. Are storage containers missing labels or	in poor condition (rusting)?  Y N Car	n't Tell	0							
D. WASTE MANAGEMENT N/A (Skip t	o part E)	Observed P	Pollution Source?							
<b>D1.</b> Type of waste (check all that apply):	Garbage Construction materials Hazard	lous materials	0							
D2. Dumpster condition ( <i>check all that apply</i> ): No cover/Lid is open Damaged/poor condition Leaking or evidence of leakage (stains on ground) Overflowing										
D3. Is the dumpster located near a storm dra If yes, are runoff diversion methods (be			O							
E. PHYSICAL PLANT N/A (Skip to part F) Observed Pollution Source?										
E1. Building: Approximate age: Evidence that maintenance results in discha	yrs. Condition of surfaces: Clean Stain rge to storm drains (staining/discoloration)? Y									

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#### 6B HSI OI

Hotspot Site Investigation

HSI

	•					<b></b>		<u> </u>								Angelerer	and the second	
E2. Parking Lot: Approx	-						Dirty		Break	cing	up					(	Э	
		Gravel Permeab																
E3. Do downspouts disch Are downspouts	•	ous surface? Y N ted to storm drains?		_	t kn N		] No Don'		visibl ow	e						(	С	
E4. Evidence of poor clea			stains	leadi	ng te	o sto:	rm dr	ain)	?	ΥĽ	] N		Ca	n't T	ell	(	0	
F. TURF/LANDSCAPING	GAREAS	NA (skip to part G)							Ob	serv	ed I	Poll	utio	n So	urce	?[		
F1. % of site with: Forest	canopy%	Turf grass <u> 9</u> % La	ndsca	ping_	( Ù 🕼	%]	Bare 8	Soil		%							0	
F2. Rate the turf manager	nent status: 🕅	High 🗌 Medium 🔲 I	Low														0	
F3. Evidence of permanent	nt irrigation or "	non-target" irrigation	Υ	N []	₫)C	an't 🛛	[ell									0		
F4. Do landscaped areas	Irain to the stor	m drain system?	Y [	] N		Can	't Tel	1								0		
F5. Do landscape plants acc	umulate organic n	natter (leaves, grass clipping	s) on a	ljacen	t imp	pervio	ous su	rface	?	Υ[	] N	X	Car	ı't Te	:11	(	0	
G. STORM WATER INFRASTRUCTURE N/A (skip to part H) Observed Pollution Source													-					
G1. Are storm water treatment practices present? X N Unknown If yes, please describe:														о 				
G2. Are private storm drains located at the facility? X N Unknown													. (	О				
Is trash present in gutters leading to storm drains? If so, complete the index below.																		
Index Rating for Accumulation in Gutters Clean Filthy																		
Sediment			3				74		1	inury		5						
Organic material		$\square^2$	$\frac{1}{3}$									5						
Litter		$\square 2$ $\square 2$	$\exists 3$									5						
Litter     I     2     3     4     5       G3. Catch basin inspection – Record SSD Unique Site ID here:     Condition:     Dirty     Clean																		
H. INITIAL HOTSPOT STATUS - INDEX RESULTS																		
Not a hotspot (fewer than 5 circles and no boxes checked)  Potential hotspot (5 to 10 circles but no boxes checked)																		
		·	Sever		-											•		
Follow-up Action:	0 10 10 0101000														T	, 		
Refer for immediate e	nforcement			_			_											
Suggest follow-up on																		
Test for illicit dischar																		
Include in future educ																		
Check to see if hotspo	t is an NPDES :	non-filer		en.	210	tha	1.10	42	an		k							
Onsite non-residential							- pm	ר יא	910	nn	1				_	ļ		
Pervious area restorat	ion; complete P	AA sheet and record		Ør	h	2012	$\langle \dot{r} \rangle$	an	d		)							
Unique Site ID I				(a	1.0	M			No	J.								
Schedule a review of	storm water pol	lution prevention plan			1			- 403										
Notes:		sediment Grebay could Juciv be installed									T							
Stormwater 1	o Kintion V	nivin be installed																
	Scal M																	
	Spilling																	
REAL PERSON	A S																	
the the the	A.	5-1																
1 3 3 20 48 M		A. i.																
	and	mil																
		121																
		<u> </u>						1										

GTS-HS1-01 1/16/08 Gerber Drike - Stormweter Letro Fit · EXISTING-BASIN, NO SED. FOREBAY "SIGNIFICANT SED. ACUMULATION · INLET NOT IDENTIFIED OUTLET & RIPRAP CHANNEL FULL OF TREES & SHAVES · Recall that evosion was present domestream

### HSI

WATERSHED: Tanker	SUBWATERSHE	D: Chrk		UNIQUE SITE	<b>D</b> : ("B-14	HCITO				
DATE: 716108	ASSESSED BY:		CAMERA ID:	- L	PIC#:					
MAP GRID:	LAT	D	LONG	t tt	LMK#					
A. SITE DATA AND BASIC CLASSIFICATION										
Name and Address:	Category:		al 🗌 Industrial	Miscellaneous						
Supprior Enorgy	_	Transport-J	al [] Municipal Related	Golf Course						
rt.30	_		Related	Animal Facil	lity					
SIC code (if available):	Basic Descr	ription of Opera	tion:							
NPDES Status: Regulated	propan	<u>e</u>				INDEX*				
	· · ·					1,0111				
B. VEHICLE OPERATIONS N/A (Skip to				Observed P	ollution Sour	ce?				
B1. Types of vehicles: A Fleet vehicles School buses Other:										
B2. Approximate number of vehicles:		trucks								
<b>B3.</b> Vehicle activities (circle all that apply):				ashed Stored		0				
<b>B4.</b> Are vehicles stored and/or repaired outside these vehicles lacking runoff diversion repaired outside these vehicles lacking runoff diversion repaired outside the store of the store		N □ Can't Te □ N ☑ Car				0				
B5. Is there evidence of spills/leakage from		$\square$ N $\bigvee$ Can				0				
B6. Are uncovered outdoor fueling areas pre	sent? 🗌 Y 📋	N 🕅 Can't T	[ell			0				
B7. Are fueling areas directly connected to storm drains? Y N Can't Tell										
<b>B8.</b> Are vehicles washed outdoors? Y N Can't Tell Does the area where vehicles are washed discharge to the storm drain? Y N Can't Tell										
C. OUTDOOR MATERIALS N/A (Skip to		m drain? 📋 Y	N Can	<u>'t Tell</u>		0				
C1. Are loading/unloading operations preser	The second s	Can't Tell		Observed P	ollution Sour	ce?				
If yes, are they uncovered and draining towa				i't Tell		0				
C2. Are materials stored outside? 🕅 Y 🗌	N 🗌 Can't Tell	If yes, are the	y∏Liquid∏S		:					
Where are they stored?  grass/dirt area	Concrete/aspha	lt 📋 bermed :	area	F	·	0				
C3. Is the storage area directly or indirectly of	connected to storr	n drain (circle c	one)? 🗌 Y 🛄 🤅	N 🕅 Can't Tel	1	0				
C4. Is staining or discoloration around the ar	ea visible? 🗌 Y		an't Tell			0				
C5. Does outdoor storage area lack a cover?	X IN	Can't Tell				0				
C6. Are liquid materials stored without second	ndary containmen	t? KY DY	N 🗌 Can't Tell			0				
C7. Are storage containers missing labels or	in poor condition	(rusting)? 🕅 Y	Y 🗌 N 🗌 Ca	n't Tell Rust		0				
D. WASTE MANAGEMENT N/A (Skip to	part E)			Observed P	ollution Sour	ce?				
<b>D1.</b> Type of waste (check all that apply):	] Garbage 🔲 C	Construction ma	terials 🗌 Hazar	dous materials		0				
<b>D2.</b> Dumpster condition ( <i>check all that apple</i> evidence of leakage (stains on ground)	y): 🔲 No cover/I ] Overflowing	Lid is open	Damaged/poor co	ondition Le	aking or	0				
D3. Is the dumpster located near a storm draft	n inlet? 🗌 Y 🗌	N Can't Te		*		0				
If yes, are runoff diversion methods (ber E. PHYSICAL PLANT N/A (Skip to part I		g? [] Y [] ]	N 🗌 Can't Tell							
					ollution Sour	All and a second se				
E1. Building: Approximate age: $30-40$ Evidence that maintenance results in dischar		of surfaces: s (staining/disco	Clean Stain	ed 🗌 Dirty 🗍 🗌 N 🗖 Don't k	Damaged now	0				
			· • • -			and a second				

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CB-F151-01

	[SI

E2. Parking Lot: Approximate age yrs. Condition:						Dirt	уΓ	Br	eaki	ng ı	ıp						0		
Surface material       Paved/Concrete       Gravel       Permeable       Don't know         E3. Do downspouts discharge to impervious surface?       Y       N       Don't know       None visible										0									
Are downspouts directly connected to storm drains?		Y		N				know							·····				
E4. Evidence of poor cleaning practices for construction activities (stains leading to storm drain)? 🗌 Y 🗌 N 🗋 Can't Tell										0									
F. TURF/LANDSCAPING AREAS N/A (skip to part G) Observed Pollution Source?									<u>, 1</u>										
F1.% of site with: Forest canopy% Turf grass% Landscaping% Bare Soil%										0									
F2. Rate the turf management status: High Medium Low											0								
<b>F3.</b> Evidence of permanent irrigation or "non-target" irrigation Y N Can't Tell											0								
F4. Do landscaped areas drain to the storm drain system?										0									
F5. Do landscape plants accumulate organic matter (leaves, grass clippings) on adjacent impervious surface? 🗌 Y 🗌 N 🗌 Can't Tell										0									
G. STORM WATER INFRASTRUCTURE N/A (skip to	1997 - 1994 - ACT M. J. O. N.	1000 P.				207 42 			Obs	erv	ed l	Poll	utio	on S	Sou	rce			
<b>G1.</b> Are storm water treatment practices present? $\Box$ Y $\Box$	N 🗌 Unl	knov	vn	If y	es, j	pleas	se de	escrit	be:							Ster and	0		
G2. Are private storm drains located at the facility? Y N Unknown Is trash present in gutters leading to storm drains? If so, complete the index below.									Ì	0									
Index Rat	ing for A	ccur	nula	atio	n in	Gut	ters									<b>R</b> SS	2.000.000		
Clean									Fil	thy									
Sediment   1   2     Organic material   1   2							} !			l		5 5							
Organic material   1   2     Litter   1   2							r L			1		5 5							
G3. Catch basin inspection – Record SSD Unique Site ID her	re:		С	ond	itio	n: [	] Di	rty		Clea	ın								
H. INITIAL HOTSPOT STATUS - INDEX RESULTS																			
Not a hotspot (fewer than 5 circles and no boxes checked)	D Pote	entia	l ho	otspo	ot (	5 to	10 c	ircle	s bu	t no	bo	xes	che	cke	d)				
Confirmed hotspot (10 to 15 circles and/or 1 box checked	l) 🗌 Seve	ere l	ots	pot	(>1	5 cir	cles	and/	or 2	or	mor	e bo	oxe	s ch	eck	ed)			
Follow-up Action:																			
Refer for immediate enforcement																			
Suggest follow-up on-site inspection Test for illicit discharge																			
Include in future education effort																			
Check to see if hotspot is an NPDES non-filer																			
Onsite non-residential retrofit	<b>_</b>						_	_											
Pervious area restoration; complete PAA sheet and record Unique Site ID here:	·						·											-+	
Schedule a review of storm water pollution prevention pla	m –				_														
							_												
Notes:		<u> </u>			-		_	_									_	_	
		+							$\left  - \right $										
		+																	
		-																	
								_											
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		+							-										
		+										-	$\square$				_		
		I	I	L	I	I					1	l	l			L			

e h



WATERSHED: Tanker	SUBWATERSHED: CLARKS	UNIQUE SITE ID: CB -N	5A-01							
DATE: 1/10/08	Assessed By: C.B. DB	-								
A. NEIGHBORHOOD CHARACTERIZ	ATION									
DATE:       Image:										
If unknown, address (or streets) surveyed	1()		50							
Homeowners Association?	Unknown If yes, name and contact		[39][45							
Residential (circle average single family										
	Single Family Attached (Duplexes, Row Homes) <1/8 1/8 1/4 1/3 1/3 acre Multifamily (Apts, Townhomes, Condos)									
Single Family Detached	$<\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{2}$ $1 > 1$ a									
Estimated Age of Neighborhood: <u>20</u>	years Percent of Homes with Garag	ges: <u>0</u> % With Basements <u></u>	2% INDEX*							
Sewer Service? Y IN			O							
Index of Infill, Redevelopment, and Rem		of units 🛄 5-10% 🛄 >10%	O							
Record percent observed for each depending on applicability		Percentage Comments/No	tes							
B. YARD AND LAWN CONDITIONS										
B1. % of lot with impervious cover	1	40								
<b>B2.</b> % of lot with grass cover		40	0							
B3. % of lot with landscaping (e.g., mule	ched bed areas)	20	<b>Ø</b>							
<b>B4.</b> % of lot with bare soil		0	Ő							
*Note: B1 through B4 must tota	1 100%									
<b>B5.</b> % of lot with forest canopy		10								
<b>B6.</b> Evidence of permanent irrigation or '	'non-target" irrigation	NO/09	0							
		High: 50	0							
B7. Proportion of <i>total neighborhood</i> turn	f lawns with following	Med: 40								
management status:		Low: 10								
B8. Outdoor swimming pools?										
· · · · · · · · · · · · · · · · · · ·			0							
· · · · · · · · · · · · · · · · · · ·	N 🗌 Can't Tell		0							
C. DRIVEWAYS, SIDEWALKS, AND C										
C1. % of driveways that are impervious		100								
C2. Driveway Condition Clean Stained Dirty Breaking up										
C3. Are sidewalks present? Y X N If yes, are they on one side of street or along both sides Spotless Covered with lawn clippings/leaves Receiving 'non-target' irrigation										
What is the distance between the sidewalk and street? ft. Is pet waste present in this area? $\Box$ Y $\Box$ N $\Box$ N/A										
<b>C4.</b> Is curb and gutter present? $X Y \square N$ If yes, check all that apply:										
· · · · = = - · · · · · · · · · · · · ·	Clean and Dry 🗌 Flowing or standing water 🔀 Long-term car parking 🗌 Sediment									
Organic matter, leaves, lawn clippings 🗌 Trash, litter, or debris 🗌 Overhead tree canopy										

* INDEX: O denotes potential pollution source; ♦ denotes a neighborhood restoration opportunity

# CB -NSA=O1 Neighborhood Source Assessment

# NSA

D. ROOFTOPS									. 1						
D1. Downspouts are directly connected to storm drains or sanita	ry se	wer												$\diamond$	Q
D2. Downspouts are directed to impervious surface					()										
D3. Downspouts discharge to pervious area					96										
D4. Downspouts discharge to a cistern, rain barrel, etc.															
*Note: C1 through C4 should total 100%													20030		
D5. Lawn area present downgradient of leader for rain garden?	Ŕ	Υ[	]N												$\diamond$
E. COMMON AREAS															
E1. Storm drain inlets? Y N If yes, are they stenciled? Catch basins inspected? Y N If yes, include U	nique	e Sit	e ID	froi						Dirt	у				<b>\$</b> 0
E2. Storm water pond? Y N Is it a wet pond or dry pond? Is it overgrown? Y N What is the estimated pond area? <a href="https://wet.acre"></a> about 1 acre > 1 acre											100 100 100 100 100 100 100 100 100 100		$\diamond$		
E3. Open Space? Y X N If yes, is pet waste present?	] Y	נ 🗌	N di	umpi	ing?		Υ[	Ν					and the second	(	0
Buffers/floodplain present: Y N If yes, is encr	oach	men	t evi	ident	? 🗌	Y		N							E.
F. INITIAL NEIGHBORHOOD ASSESSMENT AND RECOM	<b>MEN</b> I	DAT	ION	s -			(.).					ej. ::			
Based on field observations, this neighborhood has significant i	ndica	tors	for	the f	ollo	wing	<u>д: (с</u>	heck	all	that	app	ly)			0
Nutrients Oil and Grease Trash/Litter Bacteria	Ø	Sed	imeı	nt [	] Ot	her									0
Recommended Actions							d A					A			
Specific Action		Bett	er	(a	ndy	xaf	)EV-9 1-5	10	11	Inc	ren	.sed			
Onsite retrofit potential?			(	re	N	iol	25	la	Ś	ea	5.	,			
Better lawn/landscaping practice?			V				,								
Better management of common space?															
Pond retrofit?															
<ul> <li>Multi-family Parking Lot Retrofit?</li> <li>Other action(s)</li> </ul>															
Initial Assessment															
Initial Assessment															
NSA Pollution Severity Index															
Severe (More than 10 circles checked)															
$\square$ High (5 to 10 circles checked)															
Moderate (Fewer than 5 circles checked)														—	
None (No circles checked)															
Neighbouhood Destanction Operantication Index															
Neighborhood Restoration Opportunity IndexHigh(More than 5 diamonds checked)															
Moderate (3-5 diamonds checked)															
(Fewer than 3 diamonds checked)															
NOTES	L			L						L	I		l		

NOTES:

Neighborhood Source Assessment



WATERSHED: TANUL hoorn	SUBWATERSHED: TUCKOR	UNIQUE SI	UNIQUE SITE ID: TB-NSA-O)							
DATE: 71/6/08	ASSESSED BY:	CAMERA I	D:	PIC#:						
A. NEIGHBORHOOD CHARACTERIZ	ATION									
Neighborhood/Subdivision Name:		Ne	ighborhood Area (ac	cres) 106 (HS)						
If unknown, address (or streets) surveyed Mladar Brook Ave -	1) Buke, Amberst									
Homeowners Association? Y N	Unknown If yes, name and cont	act information:								
Residential (circle average single family										
Single Family Attached (Duplexes, R Single Family Detached	ow Homes) $< \frac{1}{8}  \frac{1}{8}  \frac{1}{4}  \frac{1}{3}  \frac{1}{3}  \frac{1}{3}  \frac{1}{3}  \frac{1}{3}  \frac{1}{3}  \frac{1}{3}  \frac{1}{4}  $		mily (Apts, Townho	omes, Condos)						
Estimated Age of Neighborhood: \O			Home Park	INDEX*						
Sewer Service?		1903. <u>[UO</u> /0 WIII		and the second						
Index of Infill, Redevelopment, and Rem	odeling No Evidence C<5%	of units 10%		0						
Record percent observed for each		and the second								
depending on applicability	and/or site complexity	Percentage	Comments/Notes							
B. YARD AND LAWN CONDITIONS										
<b>B1.</b> % of lot with impervious cover		50								
<b>B2.</b> % of lot with grass cover		30		0						
B3. % of lot with landscaping (e.g., mule	ched bed areas)	20	· · · · · · · · · · · · · · · · · · ·	$\diamond$						
<b>B4.</b> % of lot with bare soil		0	ann an an Arthur ann an Arthur an Arthur ann an Arthur	0						
*Note: B1 through B4 must tota	l 100%	• •								
<b>B5.</b> % of lot with forest canopy		20		$\diamond$						
B6. Evidence of permanent irrigation or '	'non-target" irrigation			0						
		High: <u>/00</u>		0						
B7. Proportion of total neighborhood tur	f lawns with following	Med:								
management status:		Low:								
B8. Outdoor swimming pools?	Can't Tall Estimated # 1/		·····							
/ ····	N $\square$ Can't Tell			0						
				0						
C. DRIVEWAYS, SIDEWALKS, AND C										
C1. % of driveways that are impervious	<u>N/A</u>	100								
	Stained Dirty Breaking up			0						
C3. Are sidewalks present? $Y \square N$										
	with lawn clippings/leaves Rece	eiving 'non-target'	irrigation							
What is the distance between the										
Is pet waste present in this area? C4. Is curb and gutter present? $X Y$				0						
·	or standing water Long-term car	narking 🗍 Sedim	ent	Ö						
Organic matter, leaves, lawn										

•

* INDEX: O denotes potential pollution source; ♦ denotes a neighborhood restoration opportunity

TB-NSA -01 Neighborhood Source Assessment

# NSA

D1. Downspouts are directly connected to storm drains or sanitary sever       Image: Construct of the sanitary sever         D2. Downspouts are directed to impervious surface       Image: Construct of the sanitary sever         D3. Downspouts discharge to pervious area       Image: Construct of the sanitary sever         P4. Downspouts discharge to a cistern, rain barrel, etc.       Image: Construct of the sanitary sever         P5. Law area present downgradient of leader for rain garden? Image: Construct of the sanitary sever       Image: Construct of the sanitary sever         E1. Storm drain inlets? Image: Construct of the sanitary sever       Image: Construct of the sanitary sever       Image: Construct of the sanitary sever         E2. Storm water pond? Image: Construct of the sanitary sever       Image: Construct of the sanitary sever       Image: Construct of the sanitary sever         E3. Open Space?       Image: Construct of the sanitary sever       Image: Construct of the sanitary sever       Image: Construct of the sanitary sever         E4. Open Space?       Image: Construct of the sanitary sever       Image: Construct of the sanitary sever       Image: Construct of the sanitary sever         E3. Open Space?       Image: Construct of the sanitary sever         E3. Open Space?       Image: Construct of the sanitary sever       Image: Construct of the sanit indicators for the following: (check all	D. ROOFTOPS		22.4	ter de la compañía de			32 F	a.	- 10. ST		
D2. Downspouts are directed to impervious surface       IC         D3. Downspouts discharge to a cistern, rain barrel, etc.       %         *Note: C1 through C4 should total 100%       %         D5. Lawn area present downgradient of leader for rain garden?        Y   N         D5. Lawn area present downgradient of leader for rain garden?        Y   N         C COMMON AREAS       Second and the standard sta		ary sewer						1991		$\sim$	
D3. Downspouts discharge to a cistern, rain barrel, etc.       Image: Construct the standard of the st			1	0						0	
D4. Downspouts discharge to a cistern, rain barrel, etc.         *Note: C1 through C4 should total 100%         D5. Lawn area present downgradient of leader for rain garden? √2 YN         E. COMMON AREAS         E1. Storm drain inlets?? √2 YN If yes, are they stenciled? √2 YN Condition: √2 Catch basins inspected? √2 YN If yes, include Unique Site ID from SSD sheet:O         E2. Storm water pond? ⊕ YN If yes, include Unique Site ID from SSD sheet:O         E3. Open Space?YN If yes, is pet waste present? ∪ YN dumping?Y N         Based on field observations, this neighborhood has significant indicators for the following: (check all that apply)         Nutrients Di and Grease Trash/Litter Bacteria SedimentO there with the following: (check all that apply)         Nutrients Di and Grease Trash/Litter Bacteria SedimentO there with the following: (check all that apply)         Nutrients Di and Grease Trash/Litter Bacteria SedimentO there with the following: (check all that apply)         Netter management of common space?											
*Note: C1 through C4 should total 100%         D5. Lawn area present downgradient of leader for rain garden? ↓ Y □ N         E. COMMON AREAS         E1. Storm drain inlets? ↓ N If yes, are they stenciled? ↓ Y □ N         Catch basins inspected? ↓ Y □ N If yes, include Unique Site D from SSD sheet:         E2. Storm water pond? ↓ KY □ N If yes, is net decy stenciled? ↓ Y □ N         What is the estimated pond area? ↓ ↓ Y □ N         Based on field observations, this neighborhood has significant indicators for the following: (check all that apply)         Based on field observations, this neighborhood has significant indicators for the following: (check all that apply)         Nutrients □ 011 and Grease □ Trash/Litter □ Bacteria □ Sediment □ Other         Recommended Actions:         Specific Action         ↓ ↓ Pond tetrofit?         □ Better lawn/landscaping practice?         □ Better management of common space?         ○ Pond retrofit?         □ Multi-family Parking Lot Retrofit?         □ Other action(s)         NSA Pollution Severity Index         □ Severie (More than 10 circles checked)         □ Moderate (Fewer than 5 circles checked)         □ Moderate (3-5 diamonds checke				2							
D5. Lawn area present downgradient of leader for rain garden? ♀ Y □ N          E1. Storm drain inlex? ☆ Y □ N If yes, are they stenciled? ☆ Y □ N Condition: ☆ Clean □ Dirty          Catch basins inspected? ♀ Y □ N If yes, include Unique Site ID from SSD sheet: □          E2. Storm water pond? ☆ Y □ N If yes, include Unique Site ID from SSD sheet: □          E3. Open Space? □ Y □ N If yes, is pet waste present? □ Y □ N dumping? □ Y □ N          Buffers/fboodplain present: □ Y □ N If yes, is encroachment evident? □ Y □ N          E1.NETGENBORHOOPD ASSESSMENT AND RECOMMENDATIONS          Based on field observations, this neighborhood has significant indicators for the following: (check all that apply)          Nutrients □ Oil and Greas □ Trash/Litter □ Bacteria □ Sediment □ Other											
E. COMMON AREAS         E1. Storm drain inlets?       Y       N If yes, are they stenciled?       Y       N Condition:       Clean       Dirty         Catch basins inspected?       Y       N If yes, include Unique Site ID from SSD sheet:					•			·····	145000	Λ	<b>1</b>
E1. Storm drain inlets?       Y       N If yes, are they stenciled?       Y       N Condition:       Clean       Dirty         Catch basins inspected?       Y       N If yes, include Unique Site ID from SSD sheet:       O         E2. Storm water pond?       Y       N Is it a Y wet pond or dry pond?       Is it overgrown?       Y       N         What is the estimated pond area?       MArket A about 1 acre       > 1 acre       > 1 acre         E3. Open Space?       Y       N If yes, is pet waste present?       Y       N dumping?       Y       N         Buffers/Hoodplain present:       Y       N If yes, is pet waste present?       Y       N dumping?       Y       N         Based on field observations, this neighborhood has significant indicators for the following: (check all that apply)       O         Nutrients       O il and Grease       Trash/Litter       Bacteria       Sediment       Other         Recommended Actions       Describe Recommended Actions:       Forwall for antropy face 4 Chectherw       Athese for antropy face 4 Chectherw         MUTOnsite retrofit potential?       Better nanagement of common space?       Pond schorts       Mathese for antropy face 4 Chectherw         Multi-family Parking Lot Retrofit?       Multi-family Parking Lot Retrofit?       Multi-family Parking Lot Retrofit?       Multi-family Parking Lot Retrofit?				17. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19			24.55			$\mathbf{\nabla}$	
Catch basins inspected? Y N If yes, include Unique Site ID from SSD sheet:   E2. Storm water pond? EY N Is it a Vert pond or dry pond? Is it overgrown?   What is the estimated pond area? EVA(Acte A about 1 acre) > 1 acre   E3. Open Space? Y N If yes, is pet waste present? Y   Buffers/floodplain present: Y N If yes, is encroachment evident? Y   P.INITIAL INEIGHBORHOOD ASSESSMENT AND RECOMMENDATIONS   Based on field observations, this neighborhood has significant indicators for the following: (check all that apply)   Nutrients Oil and Grease Trash/Litter   Bacteria Sediment Other   Pond retrofit? Better lawn/andscaping practice? Better lawn/andscaping practice? Better amagement of common space? Other action(s) Thillial Assessment NALL Other action(s) NALL Other action(s) Note (More than 10 circles checked) Mone (No circles checked) More than 5 diamonds checked) Moderate (3-5 diamonds checked) Moderate (3-5 diamonds checked) Low (Fewr than 3 diamonds checked)		<u> </u>			124					<u></u>	
E2. Storm water pond?       EXY       N       Is it a Wet pond or dray pond?       Is it overgrown?       I Y       N         What is the estimated pond area?       E4/4ge(a) about 1 acre > 1 acre       > 1 acre       > 1 acre         E3. Open Space?       Y       N       If yes, is pet waste present?       Y       N       dumping?       Y       N         Buffers/floodplain present:       Y       N       If yes, is encroachment evident?       Y       N         F1NITAL NEIGHBORHGOD ASSESSMENT AND RECOMMENDATIONS       Based on field observations, this neighborhood has significant indicators for the following:       (check all that apply)       O         Nutrients       Oil and Grease       Trash/Litter       Bacteria       Sediment       Other         Recommended Actions       Specific Action       If or action of common space?       Found alon y Yale 4 Checthan with the phylor of the action of common space?         Better namagement of common space?       Pond retrofit?       Wm be larget Mong for whole         Initial Assessment       None (No circles checked)       With yes than 5 diamonds checked         None (No circles checked)       None (No circles checked)       None (Fewer than 5 diamonds checked)         Neighborhood Restoration Opportunity Index       High (More than 5 diamonds checked)       Image for than 3 diamonds checked   <	• • • • • • • • • • • • • • • • • • • •					Dir	ty				
What is the estimated pond area?   What is the estimated pond area?   E3. Open Space?   Y   N   Buffers/floodplain present:   Y   N   Buffers/floodplain present:   Y   N   Intriant   Y   N   Initial Assessment   NSA Pollution Severity Index   Severe (More than 10 circles checked)   Moderate (Fewer than 5 circles checked)   Moderate (3-5 diamonds checked)   Moderate (3-5 diamonds checked)						·				<u>O</u>	
Buffers/floodplain present: Y N If yes, is encroachment evident? Y N   F.INITIAL NEIGHBORHOOD ASSESSMENT AND RECOMMENDATIONS   Based on field observations, this neighborhood has significant indicators for the following: (check all that apply)   Nutrients Oil and Grease Trash/Litter Bacteria Sediment Other   Recommended Actions:   Specific Action   Mutrients Describe Recommended Actions:   Found 1 pend allowing: (check all that apply)   Better lawn/landscaping practice?   Better management of common space?   Pond retrofit?   Multi-family Parking Lot Retrofit?   Other action(s)   Initial Assessment   NSA Pollution Severity Index   Severe   Moderate (Fewer than 10 circles checked)   Moderate (Fewer than 5 circles checked)   Moderate (3-5 diamonds checked)   Moderate (3-5 diamonds checked)   Low   (Fewer than 3 diamonds checked)	E2. Storm water pond? KY IN Is it a K wet pond or What is the estimated pond area?	dry pond? ut 1 acre $2 >$	ls it ov 1 acre	ergrov	/m? [凶	, Ү [] .	N			¢.	
PINITIAL NEIGHBORHOOD ASSESSMENT AND RECOMMENDATIONS         Based on field observations, this neighborhood has significant indicators for the following: (check all that apply)       O         Nutrients       Oil and Grease       Trash/Litter       Bacteria       Sediment       Other       O         Recommended Actions       Specific Action       Describe Recommended Actions:       Found at point all other       Yale 4 Checkthow         Multi-family Pointial?       Better lawn/landscaping practice?       Better lawn/landscaping practice?       Found at point all other       Atther the Swall for antice with the found of the strength	E3. Open Space? Y N If yes, is pet waste present?	Y N du	mping?	□ Y	🗌 N					0	
Based on field observations, this neighborhood has significant indicators for the following: (check all that apply)   Nutrients   Oil and Grease   Trash/Litter   Becteria   Specific Action   Mathematication   Describe Recommended Actions:   Found allowing: Yale 4 Checking   Better lawn/landscaping practice?   Better management of common space?   Pond retrofit?   Multi-family Parking Lot Retrofit?   Other action(s)   Initial Assessment   NSA Pollution Severity Index   Severe (More than 10 circles checked)   Moderate (Fewer than 5 circles checked)   Moderate (Grewer than 5 diamonds checked)   Moderate (3-5 diamonds checked)   Moderate (3-5 diamonds checked)   Low (Fewer than 3 diamonds checked)	Buffers/floodplain present: 🗌 Y 🗌 N If yes, is encu	roachment evid	lent?	Y [	] N						
Nutrients Oil and Grease   Trash/Litter Bacteria   Better Bacteria   Specific Action   Mathematical Section   Better lawn/landscaping practice?   Better nanagement of common space?   Pond retrofit?   Multi-family Parking Lot Retrofit?   Other action(s)   Initial Assessment  NSA Pollution Severity Index Severe (More than 10 circles checked)  Moderate (Fewer than 5 circles checked) Moderate (Fewer than 5 circles checked) Moderate (3-5 diamonds checked)  Low (Fewer than 3 diamonds checked)	F. INITIAL NEIGHBORHOOD ASSESSMENT AND RECOM	MENDATIONS					4.54	571.	1145 115	NGZ:	
Nutlents       Off and Orease       If as inflating         Becommended Actions       Sectific Action         Specific Action       For A 1 pond along Yale 4 Chethan         Better lawn/landscaping practice?       For A 1 pond along Yale 4 Chethan         Better management of common space?       Multi-family Parking Lot Retrofit?         Other action(s)       Multi-family Parking Lot Retrofit?         Other action(s)       Multi-family Parking Lot Retrofit?         Other action(s)       Multi-family Parking Lot Retrofit?         Multi-family Parking Lot Retrofit?       Multi-family Developer to the second of the secon	Based on field observations, this neighborhood has significant i	ndicators for th	ne follo	wing:	(check	all that	t app	ly)		0	
Specific Action   Mathematical Specific Action   Better lawn/landscaping practice?   Better lawn/landscaping practice?   Better management of common space?   Pond retrofit?   Multi-family Parking Lot Retrofit?   Other action(s)   Initial Assessment   NSA Pollution Severity Index   Severe (More than 10 circles checked)   High (5 to 10 circles checked)   Moderate (Fewer than 5 circles checked)   Moderate (3-5 diamonds checked)   Moderate (3-5 diamonds checked)   Low (Fewer than 3 diamonds checked)	Nutrients Oil and Grease Trash/Litter Bacteri	a 🗌 Sediment	t 🗌 Ot	her						0	
Better hawh landscaping practice?     Better management of common space?     Multi-family Parking Lot Retrofit?     Other action(s)     Initial Assessment     NSA Pollution Severity Index   Severe (More than 10 circles checked)   High (5 to 10 circles checked)   Moderate (Fewer than 5 circles checked)   Neighborhood Restoration Opportunity Index   High (More than 5 diamonds checked)   Moderate (3-5 diamonds checked)   Low (Fewer than 3 diamonds checked)	Recommended Actions								1		
Better hawh landscaping practice?     Better management of common space?     Multi-family Parking Lot Retrofit?     Other action(s)     Initial Assessment     NSA Pollution Severity Index   Severe (More than 10 circles checked)   High (5 to 10 circles checked)   Moderate (Fewer than 5 circles checked)   Neighborhood Restoration Opportunity Index   High (More than 5 diamonds checked)   Moderate (3-5 diamonds checked)   Low (Fewer than 3 diamonds checked)		Found	11	pone	l a	lon	٦	Yale	r \$(	"hat	idur
Better hawh landscaping practice?     Better management of common space?     Multi-family Parking Lot Retrofit?     Other action(s)     Initial Assessment     NSA Pollution Severity Index   Severe (More than 10 circles checked)   High (5 to 10 circles checked)   Moderate (Fewer than 5 circles checked)   Neighborhood Restoration Opportunity Index   High (More than 5 diamonds checked)   Moderate (3-5 diamonds checked)   Low (Fewer than 3 diamonds checked)	-	Attornt	to to	5 Sh	rall	tor	-er	the	e-h	erati	borte
Pond retrofit?   Multi-family Parking Lot Retrofit?   Other action(s)     Initial Assessment     NSA Pollution Severity Index   Severe (More than 10 circles checked)   High (5 to 10 circles checked)   Moderate (Fewer than 5 circles checked)   None (No circles checked)   Meighborhood Restoration Opportunity Index   High (More than 5 diamonds checked)   Moderate (3-5 diamonds checked)   Low (Fewer than 3 diamonds checked)	• • •	other	soad	<b>C</b>	- tot	Tent	A		-	. [.	
Multi-family Parking Lot Retrofit?   Other action(s)   Initial Assessment   NSA Pollution Severity Index   Severe (More than 10 circles checked)   High (5 to 10 circles checked)   Moderate (Fewer than 5 circles checked)   None (No circles checked)   None (No circles checked)   High (More than 5 diamonds checked)   High (More than 5 diamonds checked)   Moderate (3-5 diamonds checked)   Low (Fewer than 3 diamonds checked)		man				· · · · ·	n'				i
Other action(s)     Initial Assessment     NSA Pollution Severity Index   Severe (More than 10 circles checked)   High (5 to 10 circles checked)   Moderate (Fewer than 5 circles checked)   None (No circles checked)   None (No circles checked)   High (More than 5 diamonds checked)   High (More than 5 diamonds checked)   Moderate (3-5 diamonds checked)   Low (Fewer than 3 diamonds checked)		1 many be	. larg	L l	Mon	gh.	tor	- ~	hole	-	
Initial Assessment   NSA Pollution Severity Index   Severe (More than 10 circles checked)   High (5 to 10 circles checked)   Moderate (Fewer than 5 circles checked)   None (No circles checked)   Neighborhood Restoration Opportunity Index   High (More than 5 diamonds checked)   Moderate (3-5 diamonds checked)   Moderate (3-5 diamonds checked)   Low (Fewer than 3 diamonds checked)			hei	Table	sort	read					
NSA Pollution Severity Index   Severe (More than 10 circles checked)   High (5 to 10 circles checked)   Moderate (Fewer than 5 circles checked)   None (No circles checked)   Neighborhood Restoration Opportunity Index   High (More than 5 diamonds checked)   Moderate (3-5 diamonds checked)   Low (Fewer than 3 diamonds checked)											-
Severe (More than 10 circles checked)   High (5 to 10 circles checked)   Moderate (Fewer than 5 circles checked)   None (No circles checked)   None (No circles checked)   High (More than 5 diamonds checked)   High (More than 5 diamonds checked)   Moderate (3-5 diamonds checked)   Low (Fewer than 3 diamonds checked)											
High (5 to 10 circles checked)   Moderate (Fewer than 5 circles checked)   None (No circles checked)     Neighborhood Restoration Opportunity Index   High (More than 5 diamonds checked)   Moderate (3-5 diamonds checked)   X Low (Fewer than 3 diamonds checked)	NSA Pollution Severity Index										
Moderate (Fewer than 5 circles checked)   None   None   Neighborhood Restoration Opportunity Index   High   Moderate (3-5 diamonds checked)   Moderate (3-5 diamonds checked)   Low											-
None       (No circles checked)         Neighborhood Restoration Opportunity Index         High       (More than 5 diamonds checked)         Moderate (3-5 diamonds checked)         Low       (Fewer than 3 diamonds checked)	- , ,										
'       Neighborhood Restoration Opportunity Index         Image: High (More than 5 diamonds checked)       Image: High (More than 5 diamonds checked)         Image: Moderate (3-5 diamonds checked)       Image: High (Fewer than 3 diamonds checked)         Image: Moderate (3-5 diamonds checked)       Image: High (Fewer than 3 diamonds checked)											-
High       (More than 5 diamonds checked)         Moderate (3-5 diamonds checked)       Image: Constraint of the cons	$\Delta$ None (No circles checked)										
High       (More than 5 diamonds checked)         Moderate (3-5 diamonds checked)       Image: Constraint of the cons	Neighborhood Restoration Opportunity Index										_
Moderate (3-5 diamonds checked)       Low       (Fewer than 3 diamonds checked)											
Low (Fewer than 3 diamonds checked)	· · · · · · · · · · · · · · · · ·					• • • • • • • • • • • • • • • • • • • •					
	•							<u>├</u> ──┼		$\left  \right $	-1
See stream assessment forms											
see stream assessment forms	In a conta se Accounted										
	See stream assessment forms										-

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Neighborhood Source Assessment



	<u> </u>			
WATERSHED: WR / (B	SUBWATERSHED:	UNIQUE SITI	D: WR-NS	A-01
DATE: <u>7/16/08</u>	ASSESSED BY: ABDE	CAMERA ID:		PIC#:
A. NEIGHBORHOOD CHARACTERIZ	<ul> <li>A second sec second second sec</li></ul>			
Neighborhood/Subdivision Name:		Neig	hborhood Area (ac	cres) 10-3020
If unknown, address (or streets) surveyed	d:			33 Acres
Homeowners Association? X V N	Unknown If yes, name and con	tact information: 1	antal	L GIS
Residential (circle average single family				
Single Family Attached (Duplexes, F			ily (Apts, Townho	omes, Condos)
Single Family Detached	$<\frac{1/4}{1/4}$ $\frac{1}{4}$ $\frac{1}{2}$ $\frac{1}{2}$ >1		ome Park	
Estimated Age of Neighborhood: <u>1()</u>	years Percent of Homes with Gar	ages: <u>/</u> % With	Basements%	Sector State
Sewer Service? Y N	11: 23.1			O
Index of Infill, Redevelopment, and Ren	·	of units [_] 5-10% [	」>10%	O de
Record percent observed for each depending on applicability		Percentage	Comments/Notes	
B. YARD AND LAWN CONDITIONS				
<b>B1.</b> % of lot with impervious cover		50		
<b>B2.</b> % of lot with grass cover		30		0
<b>B3.</b> % of lot with landscaping (e.g., mul	ched bed areas)	20		$\diamond$
<b>B4.</b> % of lot with bare soil		0		0
*Note: B1 through B4 must tota	ıl 100%			
<b>B5.</b> % of lot with forest canopy		20		$\diamond$
<b>B6.</b> Evidence of permanent irrigation or	"non-target" irrigation	N		0
		High: <u>180</u>		0
<b>B7.</b> Proportion of <i>total neighborhood</i> tur	f lawns with following	Med:		
management status:		Low:		
B8. Outdoor swimming pools? []Y	Can't Tell Estimated #			0
	$N \square$ Can't Tell			0
C. DRIVEWAYS, SIDEWALKS, AND C			7.1.1	
C1. % of driveways that are impervious		100		
C2. Driveway Condition 🗌 Clean 🔀	Stained Dirty Breaking up			0
C3. Are sidewalks present? $\overrightarrow{X}$ Y $\square$ N		t $\Box$ or along both sid	les	
	with lawn clippings/leaves 🔲 Rec			0
What is the distance between the	e sidewalk and street? ft.			$\diamond$
Is pet waste present in this area?	P 🗌 Y 🗌 N 🗌 N/A	· · · · · · · · · · · · · · · · · · ·		Ó
C4. Is curb and gutter present? $Y$	• •			
	or standing water 🛛 Long-term car			0
Organic matter, leaves, lawn	clippings	ris 🔲 Overhead tree	canopy	$\diamond$

* INDEX: O denotes potential pollution source;  $\Diamond$  denotes a neighborhood restoration opportunity

Neighborhood Source Assessment



D. ROOFTOPS				24										4 - S. -	je.	
D1. Downspouts are directly connected to storm drains or sanita	ry se	wer			V								1000	Ø	C	5
D2. Downspouts are directed to impervious surface													Colorado da			
D3. Downspouts discharge to pervious area				·									10000		(	
D4. Downspouts discharge to a cistern, rain barrel, etc.																
*Note: C1 through C4 should total 100%		/		·			····	•					1824			
<b>D5.</b> Lawn area present downgradient of leader for rain garden?	Ū	Υ[	]N												8	
E. COMMON AREAS			1				1									Ż
E1. Storm drain inlets? Y N If yes, are they stenciled? Y N Condition: Clean Dirty													<	Ø		
Catch basins inspected? V N If yes, include Unique Site ID from SSD sheet: <u>NSX-OI</u>											-	(	<u> </u>			
E2. Storm water pond? Y N Is it a wet pond or dry pond? Is it overgrown? Y N What is the estimated pond area? <pre> </pre> <pre> </pre> <td></td> <td>•</td> <td>$\diamond$</td> <td></td>												•	$\diamond$			
E3. Open Space? Y N If yes, is pet waste present?													100600	(	0	
Buffers/floodplain present: Y V N If yes, is encr	oach	men	t evi	dent	?	] Y	1	N					1000			
F. INITIAL NEIGHBORHOOD ASSESSMENT AND RECOMM	<b>MENI</b>	DAT	ION	S .												
Based on field observations, this neighborhood has significant indicators for the following: (check all that apply) Nutrients Oil and Grease Trash/Litter Bacteria Sediment Other Compact A in particular in the												(	С			
Recommended Actions	Des	scril	be R	ecor	nme	ende	d Ac	tion	s:							
Specific Action		$\overline{\mathcal{D}}$			s	5	Ric	لم				مر				
Onsite retrofit potential?		62	g		ren	5	100	9	ar	~6	pa	102				
Better lawn/landscaping practice?																
Better management of common space? Pond retrofit?																
Multi-family Parking Lot Retrofit?																
$\Box  \text{Other action(s)}$																
Initial Assessment																
NSA Pollution Severity Index																
Severe (More than 10 circles checked)																
High (5 to 10 circles checked) Moderate (Fewer than 5 circles checked)																
None (No circles checked)																
Neighborhood Restoration Opportunity Index																
High (More than 5 diamonds checked)																
Moderate (3-5 diamonds checked)																
Low (Fewer than 3 diamonds checked)																
										1						

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WATERSHED: TANKUR	SUBWATERSHED: LTP.	UNIQUE SITE ID:	-NSA-OI
DATE: <u>7//b/08</u>	ASSESSED BY:	CAMERA ID:	PIC#:
A. NEIGHBORHOOD CHARACTERIZ	ZATION		
Neighborhood/Subdivision Name:		Neighborhood Are	ea (acres) <u>3</u>
If unknown, address (or streets) surveyed			
Homeowners Association?		act information:	
Residential (circle average single family	, ,		
Single Family Attached (Duplexes, R Single Family Detached	Row Homes) $< \frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{4}$ $\frac{1}{3}$ $\frac{1}{3}$ $< \frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{2}$ 1 >1		wnhomes, Condos)
Estimated Age of Neighborhood: 50	years Percent of Homes with Gara	*	2% INDEX*
Sewer Service? 💢 Y 🔲 N			0
Index of Infill, Redevelopment, and Ren	nodeling 🕅 No Evidence 🔲 <5%	of units 5-10% >10%	0
Record percent observed for each depending on applicability		Percentage Comments/N	otes -
B. YARD AND LAWN CONDITIONS	and or other comparately		
B1. % of lot with impervious cover		50	
<b>B2.</b> % of lot with grass cover		40	0
<b>B3.</b> % of lot with landscaping (e.g., mul	ched bed areas)	10	×
<b>B4.</b> % of lot with bare soil		0	0
*Note: B1 through B4 must tota	ul 100%		
<b>B5.</b> % of lot with forest canopy		0	$\diamond$
<b>B6.</b> Evidence of permanent irrigation or	"non-target" irrigation		0
		High: 16	0
<b>B7.</b> Proportion of <i>total neighborhood</i> tur management status:	f lawns with following	Med: SD	
management status.		Low: 0	
<b>B8.</b> Outdoor swimming pools?	Can't Tell Estimated #		0
<b>B9.</b> Junk or trash in yards? $X \square$	N Can't Tell CAVS(1)		,Ø'
C. DRIVEWAYS, SIDEWALKS, AND C	the second s		
C1. % of driveways that are impervious	IN/A I was pervious	95	
C2. Driveway Condition 🕅 Clean 🗌		f	0
C3. Are sidewalks present? $\Box$ Y X N			
	with lawn clippings/leaves 🔲 Rec	eiving 'non-target' irrigation	0
What is the distance between th			$\diamond$
Is pet waste present in this area			0
C4. Is curb and gutter present? XY	N If yes, check all that apply:		
Organic matter, leaves, lawn	or standing water 📉 Long-term car		Q
	Cuppings rash, inter, or deb	ris 🗌 Overhead tree canopy	$\diamond$

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* INDEX: O denotes potential pollution source;  $\diamond$  denotes a neighborhood restoration opportunity

#### LTR-NGA-OL Neighborhood Source Assessment



D. ROOFTOPS				64												
D1. Downspouts are directly connected to storm drains or sanita	ıry se	ewer											1000	$\diamond$	C	)
D2. Downspouts are directed to impervious surface					Ę	~										
D3. Downspouts discharge to pervious area					9	5							1			
D4. Downspouts discharge to a cistern, rain barrel, etc.					V									0.27	174.1	
*Note: C1 through C4 should total 100%				_l											47.759A.3	<u>9506</u> 220
D5. Lawn area present downgradient of leader for rain garden?		Υ[	]N												$\diamond$	
E. COMMON AREAS																
<b>E1.</b> Storm drain inlets? $\sum Y \square N$ If yes, are they stenciled?		Y	] N	Con	ditio	on: [	] C	lean		Dirt	у		attate		$\diamond$	
Catch basins inspected? 💭 Y 🗌 N If yes, include U	niqu	e Sit	e ID	froi	n SS	SD s	heet	UPA	JS,	A	-0	1			Õ	
E2. Storm water pond? Y X N Is it a wet pond or dry pond? Is it overgrown? Y N N What is the estimated pond area? <a href="https://www.storm.com"></a> A acre about 1 acre > 1 acre													$\diamond$			
E3. Open Space? Y X N If yes, is pet waste present?	] Y		N đ	ump	ing?		Y [	] N	•				100	1.	0	
Buffers/floodplain present: Y N If yes, is encr	oach	mer	it evi	ident	t? 🗌	] Y		N								
F. INITIAL NEIGHBORHOOD ASSESSMENT AND RECOM	MEN	DAI	ION	IS -								El				
Based on field observations, this neighborhood has significant i	ndica	ators	for	the f	ollo	wing	g: (c	heck	all	that	app	ly)			0	
Nutrients Oil and Grease Trash/Litter Bacteria	١X	Sed	ime	nt 🗌	] 01	her .									0	
Recommended Actions	De	scri	be R	leco	mme	ende	d A	ctio	1S:			1	•.			
Specific Action	Control Pore (C) Spire of M											An	~5			
Onsite retrofit potential?			19	Ø0		ili	l									
Better lawn/landscaping practice?				ļ												
<ul> <li>Better management of common space?</li> <li>Pond retrofit?</li> </ul>																
Multi-family Parking Lot Retrofit?																
$\Box  \text{Other action(s)}$																
Initial Assessment																
NSA Pollution Severity Index																
Severe (More than 10 circles checked)																
High $(5 \text{ to } 10 \text{ circles checked})$																
Moderate (Fewer than 5 circles checked)	$\square$															
None (No circles checked)	<b></b>															
Neighborhood Restoration Opportunity Index																
High (More than 5 diamonds checked)																
Moderate (3-5 diamonds checked)																
Low (Fewer than 3 diamonds checked)																

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Neighborhood Source Assessment

NSA

<b></b>			/*B -	
	SUBWATERSHED: Gages	UNIQUE	SITE ID: NSA - (	
DATE: <u>716/68</u>	ASSESSED BY: K.B., DB	CAMERA	MD:	PIC#: 3694 ~ [
A. NEIGHBORHOOD CHARACTERIZ	the second se			
Neighborhood/Subdivision Name: Valle		Vay]	Neighborhood Area (	acres) <u>55</u> (0
If unknown, address (or streets) surveyed:	Y Y	)		
Homeowners Association? Y N	Unknown If yes, name and cor	tact information.		
Residential (circle average single family				
Single Family Attached (Duplexes, Ro			ifamily (Apts, Townl	nomes, Condos)
Single Family Detached	$<\frac{1/4}{1/4}$ $\frac{1/4}{1/2}$ $\frac{1}{2}>1$	01	ile Home Park	
Estimated Age of Neighborhood: 25 y		rages: <u>49</u> % V	Vith Basements (0)	% INDEX*
Sewer Service? XY IN (look P				0
Index of Infill, Redevelopment, and Remo		6 of units 🗌 5-10	% 🕅 >10%	O
Record percent observed for each depending on applicability a		Percentage	Comments/Note	S -
B. YARD AND LAWN CONDITIONS	musi sue comprexity			
B1. % of lot with impervious cover		20		
<b>B2.</b> % of lot with grass cover		60		0
B3. % of lot with landscaping (e.g., mulcl	ned bed areas)	20		$\diamond$
<b>B4.</b> % of lot with bare soil				Ŏ
*Note: B1 through B4 must total	100%			
<b>B5.</b> % of lot with forest canopy				$\diamond$
<b>B6.</b> Evidence of permanent irrigation or "r	ion-target" irrigation	+70		0
		High: 70		0
B7. Proportion of total neighborhood turf	lawns with following	Med: (0		
management status:		Low:		
<b>B8.</b> Outdoor swimming pools? XY N				0
	I 🗌 Can't Tell			0
C. DRIVEWAYS, SIDEWALKS, AND C	URBS			
C1. % of driveways that are impervious	□ N/A	100		
C2. Driveway Condition 🖾 Clean 🗌 St	tained 🔲 Dirty 🗌 Breaking up			0
C3. Are sidewalks present? $\Box$ Y X N				
	vith lawn clippings/leaves 🔲 Re	ceiving 'non-targe	et' irrigation	0
What is the distance between the	······································			$\diamond$
Is pet waste present in this area?				0
	□ N If yes, check all that apply			
Organic matter, leaves, lawn o	standing water Long-term ca			
* NDEX: O denotes notent			uee canopy	$\diamond$

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INDEX: O denotes potential pollution source;  $\diamondsuit$  denotes a neighborhood restoration opportunity

GB-NSA-01

#### Neighborhood Source Assessment

## NSA

D. ROOFTOPS									4 Ú				i t			
D1. Downspouts are directly connected to storm drains or sanita	ıry se	wer										ro-Filolo 19.00		$\diamond$	C	>
D2. Downspouts are directed to impervious surface				1	29	_							Contraction of			
D3. Downspouts discharge to pervious area				2	10	5								5		
D4. Downspouts discharge to a cistern, rain barrel, etc.					t								1000			
*Note: C1 through C4 should total 100%																
<b>D5.</b> Lawn area present downgradient of leader for rain garden?		ΥŞ	₫n											4	Ø	
E. COMMON AREAS																
<b>E1.</b> Storm drain inlets? $\square Y \square N$ If yes, are they stenciled?										Dirt	у				$\diamond$	
Catch basins inspected? X IN If yes, include U	-												- 33		0	
E2. Storm water pond? Y N Is it a wet pond or dry pond? Is it overgrown? Y N N What is the estimated pond area? <a href="https://www.storm.com"></a> A cre A cre													$\diamond$			
E3. Open Space? Y X N If yes, is pet waste present?	]Y	[] I	N di	ımpi	ing?		Υ[	N							0	
Buffers/floodplain present: 📉 Y 🗌 N If yes, is enci	oach	men	t evi	dent	?₹	ţΥ		N								
F. INITIAL NEIGHBORHOOD ASSESSMENT AND RECOM	Children and the state	11. A.		100.000 0.000								Ęć.				
Based on field observations, this neighborhood has significant i						-	;: (c	heck	c all	that	app	ly)				
Nutrients Oil and Grease Trash/Litter Bacteria	<u>ا ا</u>	Sed	imeı	ıt [	] Ot	her_									0	
Recommended Actions						ende										
Specific Action	1	oad	lw	réV	(v	rpr	o ve	live	H	5						
<ul> <li>Onsite retrofit potential?</li> <li>Better lawn/landscaping practice?</li> </ul>				-4												
Better management of common space?																
Pond retrofit?																
Multi-family Parking Lot Retrofit?																
Other action(s)																
Initial Assessment																
NGA Dellastica Consulta Indone																
NSA Pollution Severity Index Severe (More than 10 circles checked)																
$\square High \qquad (5 to 10 circles checked)$																
Moderate (Fewer than 5 circles checked)																
None (No circles checked)																
Neighborhood Restoration Opportunity IndexHigh(More than 5 diamonds checked)																
Moderate (3-5 diamonds checked)																
Low (Fewer than 3 diamonds checked)																

NOTES:

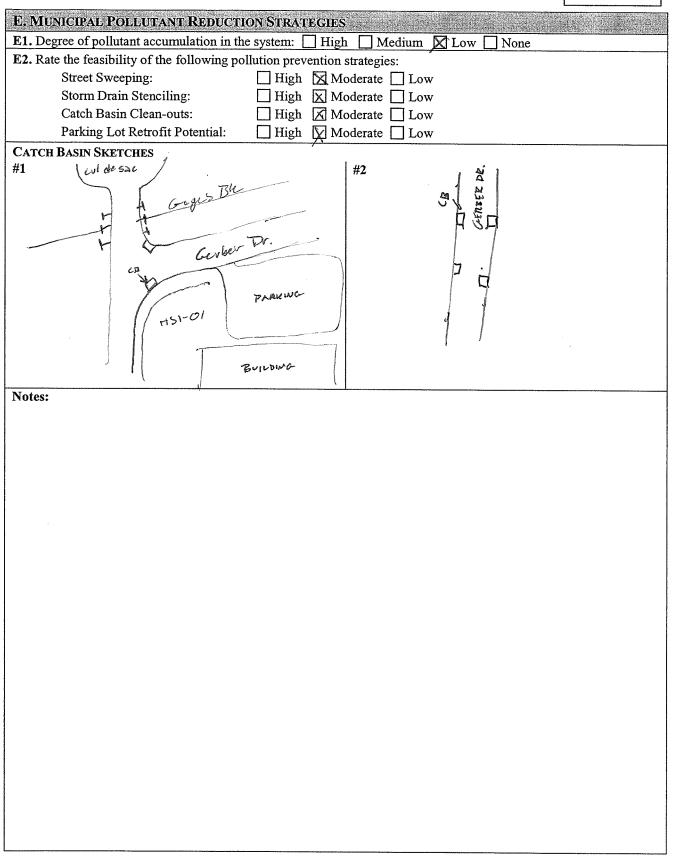
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WATERSHED:	SUBWAT	ershed: (-B	UNIQUE SITE ID: (-B-HSI-01							
DATE: 1/16/06	ASSESSE	DBY: KZ/DB	CAMERA ID: WS Sony							
MAP GRID	RAIN IN J	LAST 24 HOURS Y YN	PIC#							
A. LOCATION										
A1. Street names or neighborhood s	surveyed:	Industrial Pointh West								
A2. Adjacent land use:  Resident Mur		nmercial 🛛 Industrial 🗌 Ins Transport-Related	titutional							
A3. Corresponding HSI of NSA field sheet? If so, circle HSI or NSA and record its Unique Site ID here										
B. STREET CONDITIONS										
B1. Road Type: Arterial Collector K Local Alley Other:										
B2. Condition of Pavement: 🗌 Ne	w 🛛 Good	d 🗌 Cracked 🔲 Broken								
B3. Is on-street parking permitted [	XY 🗌 N	If yes, approximate number of	f cars per block: O							
<b>B4.</b> Are large cul-de-sacs present?										
<b>B5.</b> Is trash present in curb and gutt	f		for Accumulation in Gutters							
use the index to the right to record a		Clean	Filthy							
~ 1.0 # 000	Sediment									
Organ	ic Material									
	Litter									
C. STORM DRAIN INLETS AND CATCH BASINS										
C1. Type of storm drain conveyance	e: 🗌 open	A enclosed mixed								
C2. Percentage of inlets with catch	basin storag	ge: N/A								
Sample 1-2 catch basins per NSA/I	ISI	C3. Catch basin #1	C4. Catch basin #2							
Latitude		<u>U1º 51 '38 "</u>	<u>41°51'35"</u>							
Longitude		72° 25' 15 "	<u>nº25'17 "</u>							
LMK #										
Picture #		101-3687	101-3688							
Current Condition		🔀 Wet 🗌 Dry	🛛 Wet 🗋 Dry							
Condition of Inlet		Clear Obstructed	Clear Obstructed							
Litter Accumulation		Y YN	NY N							
Organics Accumulation		□Y 😡 N	XY DN							
Sediment Accumulation		XY 🗆 N	XY DN							
Sediment Depth (in feet)		_ <b>O-5</b> ft.	ft.							
Water Depth		<u> </u>	<u> </u>							
Evidence of oil and grease		Y N	Y N							
Sulfur smell		Y N	□Y N							
Accessible to vacuum truck		Y N	YY DN							
D. NON-RESIDENTIAL PARKING	G LOT (>2	acres)								
D1. Approximate size: _/Ô a	acres									
/ ×		ll 🗌 Empty								
<b>D3.</b> Overall condition of Pavement:	Very 2	th (no cracks) X Medium (few Rough (numerous cracks and de	epressions)							
D4. Is lot served by a storm water tr	eatment pra	actice? 🛛 Y 🗌 N If yes, des	cribe: BASIN							
<b>D5.</b> On-site retrofit potential:	xcellent [	Good Poor								



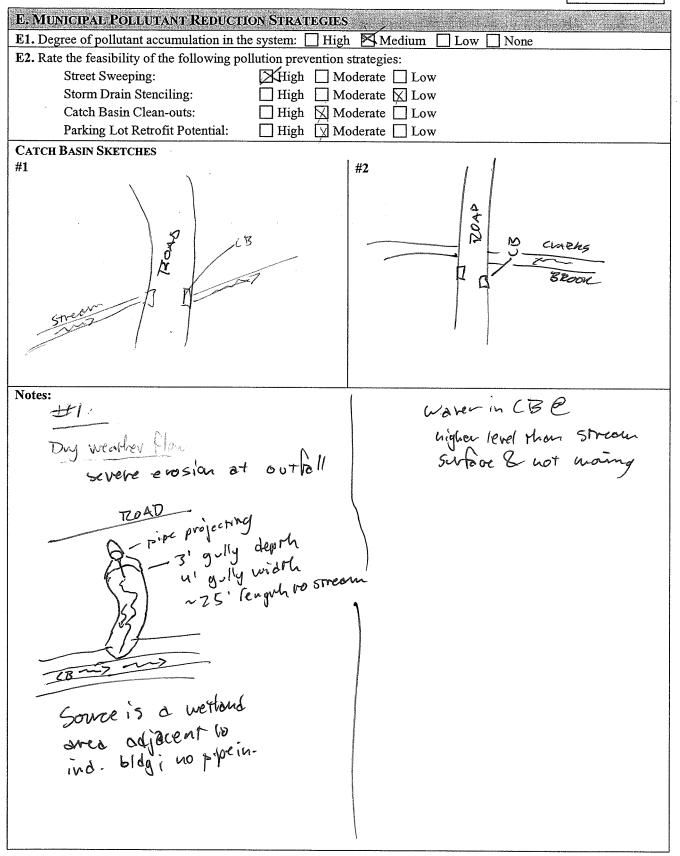




WATERSHED: ANK	SUBWATERSHED	: CTS	UNIQUE SITE ID: <	55D-01							
DATE: <u>7/16/08</u>	ASSESSED BY:	KB/DB	CAMERA ID: $W\zeta$	Sm							
Map Grid	RAIN IN LAST 24	HOURS Y YN	PIC#								
A. LOCATION											
A1. Street names or neighborhood s	urveyed:	$i \rightarrow i$									
		vh Rd Judis	smal 9-arks								
A2. Adjacent land use:  Resident Mur	ial 🗌 Commercial nicipal 🔲 Transpo		titutional								
A3. Corresponding HSI or NSA fiel	d sheet? If so, circl	e HSI or NSA and recor	rd its Unique Site ID here	>							
<b>B. STREET CONDITIONS</b>											
B1. Road Type: Arterial Collector Local Alley Other:											
B2. Condition of Pavement: 🗌 Ne	w Good XC	racked Broken									
B3. Is on-street parking permitted	Y IN If yes,	approximate number of	f cars per block:								
<b>B4.</b> Are large cul-de-sacs present?											
<b>B5.</b> Is trash present in curb and gutt		Index Rating f	or Accumulation in Gutte	erc							
use the index to the right to record a		Clean		Filthy							
	Sediment	1 2	$\Box_3 \Box_4$	$\square 5$							
Organ	ic Material		3 📈 4								
	Litter		3 4	5							
C. STORM DRAIN INLETS AND CATCH BASINS											
C1. Type of storm drain conveyance:  open enclosed mixed											
C2. Percentage of inlets with catch	X	N/A									
Sample 1-2 catch basins per NSA/I		Catch basin #1	C4. Catch ba	ısin #2							
Latitude		<u>50 ' 17 "</u>	<u>41°60 '</u>	07 "							
Longitude		21,17"	<u>72° 27 '</u>	25 "							
LMK #											
Picture #			101-37-								
Current Condition	<u>2</u>	Wet Dry		Dry							
Condition of Inlet	L	Clear Obstructed		Obstructed							
Litter Accumulation	<u>L</u>			<u></u>							
Organics Accumulation		AY DN		] N							
Sediment Accumulation	Ļ	XY IN		] N							
Sediment Depth (in feet)		ft.	0.5	ft							
Water Depth Evidence of oil and grease	<u>_</u>	<u>2,5</u> ft. ]Y ⊠N		ft.							
Sulfur smell	L	$\begin{array}{c c} \mathbf{I} & \mathbf{I} \\ \mathbf{I} \\ \mathbf{Y} & \mathbf{N} \end{array}$		N N							
Accessible to vacuum truck		$AY \square N$		N							
D. NON-RESIDENTIAL PARKING	The second s										
D1. Approximate size:a	icres vovieg										
D2. Lot Utilization: 🗌 Full 🛛 Ab											
D3. Overall condition of Pavement:	Uery Rough (	numerous cracks and de		y cracks)							
D4. Is lot served by a storm water tr	eatment practice?	Y XN If yes, desc	cribe:								
D5. On-site retrofit potential:	xcellent 🗌 Good	Poor									

.







WATERSHED: TANK	SUBWATERS	HED: LTR	UNIQUE SITE ID: 17R-N5A-01							
DATE: <u>7116108</u>	ASSESSED B	Y: KG/DB	CAMERA ID: WS Sorry							
MAP GRID	RAIN IN LAS	T 24 HOURS Y XN	PIC #							
A. LOCATION										
A1. Street names or neighborhood s	urveyed:									
Comphell Dr										
A2. Adjacent land use: Resident	ial 🗌 Commen nicipal 🔲 Tran		titutional							
	· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • • • • • • • • •	rd its Unique Site ID here NGA-01							
		CHCIE HISI OF NSA and recor	a is onique site in here <u>NGA-07</u>							
B. STREET CONDITIONS										
B1. Road Type: Arterial Collector Local Alley Other:										
B2. Condition of Pavement: 🗌 Ne										
B3. Is on-street parking permitted [	XY LIN If	yes, approximate number of	f cars per block: <u>2</u>							
<b>B4.</b> Are large cul-de-sacs present?	N Y YN									
<b>B5.</b> Is trash present in curb and gutt		Index Rating f	or Accumulation in Gutters							
use the index to the right to record a		Clean	Filthy							
	Sediment	$\square_1$ $\square_2$								
Urgan	ic Material Litter	1 $1$ $2$ $1$ $2$								
Litter     1     2     3     4     5       C. STORM DRAIN INLETS AND CATCH BASINS										
C1. Type of storm drain conveyance: open enclosed mixed										
C2. Percentage of inlets with catch	7		non							
Sample 1-2 catch basins per NSA/I	HSI	C3. Catch basin #1	C4. Catch basin #2							
Latitude		41049:32"	<u>41°49'32"</u>							
Longitude		72° 2a ' 07 "	<u>72° 79 '07 "</u>							
LMK #										
Picture #										
Current Condition		Wet VDry	Wet Dry							
Condition of Inlet Litter Accumulation		Clear Obstructed	Clear Obstructed							
Organics Accumulation		Y X N Y N								
Sediment Accumulation			Y N XY N							
Sediment Depth (in feet)		/ ft.								
Water Depth		<u> </u>								
Evidence of oil and grease		Y N	Y N							
Sulfur smell										
Accessible to vacuum truck		XY N	<u> </u>							
D. NON-RESIDENTIAL PARKING	A REAL PROPERTY AND A REAL	es)								
	icres	····								
D2. Lot Utilization: 🗌 Full 🗌 Ab										
<b>D3.</b> Overall condition of Pavement:		no cracks) 🔲 Medium (few ligh (numerous cracks and de	r cracks) 🔲 Rough (many cracks)							
D4. Is lot served by a storm water tr										
D5. On-site retrofit potential:	xcellent G	ood Poor								

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E. MUNICIPAL POLLUTANT REDUCTION	STRATEGIES		
E1. Degree of pollutant accumulation in the sy		um 🗌 Low 🗌 No	ne
<b>E2.</b> Rate the feasibility of the following pollut			
	High Moderate		
	High Moderate		
	High I Moderate		
Parking Lot Retrofit Potential:	]High 🗌 Moderate 📝	Low	
CATCH BASIN SKETCHES #1	#2	1	(
	#2		
cð Ø	] _	(B	
		¥*	
Notes:			
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Tonleev						I
WATERSHED: Carlos T	SUBWATE	RSHED: (3		UNIQUE SITE	ID: (B-A	15A-01
DATE: <u>7116108</u>	ASSESSED BY: KB/103			UNIQUE SITE ID: (B-NSA-0/ CAMERA ID: WS Sarry		
MAP GRID	RAIN IN L	AST 24 HOURS		PIC#		
A. LOCATION				I		
A1. Street names or neighborhood s	A1. Street names or neighborhood surveyed: High Mana Fraily Pak					
A2. Adjacent land use: Residenti		nercial 🔲 Indu ransport-Related	strial 🗌 Ins	titutional		
A3. Corresponding HSI or NSA fiel	d sheet? If s	o, circle HSI of N	ISA and recor	rd its Unique Si	te ID here <u>MS</u>	A-01
<b>B.</b> STREET CONDITIONS						
B1. Road Type: 🗌 Arterial 🗌 Co	ollector	Local 🗌 Alley	• Other:			
B2. Condition of Pavement: 🗌 Nev	w 🕅 Good	Cracked	Broken			
B3. Is on-street parking permitted [				f cars per block:	3	
B4. Are large cul-de-sacs present? [	Y N					
<b>B5.</b> Is trash present in curb and gutte		Ι	ndex Rating f	for Accumulatio	n in Gutters	
use the index to the right to record a	mount.	Clean			Filt	hy
	Sediment	区 1	2	3	4	5
Organic Material Litter		$1$ $\overline{\mathbf{y}}$ 1	$\square 2$			
C. STORM DRAIN INLETS AND (	sale from a part of a set of other	$\overline{T}$				
<b>C1.</b> Type of storm drain conveyance			mixed			
<b>C2.</b> Percentage of inlets with catch h			N/A			
Sample 1-2 catch basins per NSA/H		C3. Catch bas		C4	. Catch basin #2	2
Latitude		410 501	5( "	<u>41° 50 '87 "</u>		
Longitude		720 26'	46"	77 . 26 . 54 "		
LMK #						
Picture #		101-371	0	1	01-3711	
Current Condition		Wet 🕅	Dry		Wet Dry	у
Condition of Inlet		Clear 🗌	Obstructed		Clear Obs	structed
Litter Accumulation		ΔY X	N		Y N	
Organics Accumulation			N		□y 🖄 N	
Sediment Accumulation		XY 🗆	N	j	Y 🗌 N	
Sediment Depth (in feet)		<u>i</u>	ft.		0.5 ft.	
Water Depth			ft		<u>0,5</u> ft.	
Evidence of oil and grease					Y N	
Sulfur smell					Y N	
Accessible to vacuum truck		7	<u>N</u>	<u> </u>	AY DN	
D. NON-RESIDENTIAL PARKING LOT (>2 acres)						
D1. Approximate size: acres						
D2. Lot Utilization: Full About half full Empty						
D3. Overall condition of Pavement: Smooth (no cracks) Medium (few cracks) Rough (many cracks) Very Rough (numerous cracks and depressions)						
D4. Is lot served by a storm water tr	eatment prac	tice? 🗌 Y 🗍 I	N If yes, des	cribe:		
D5. On-site retrofit potential: Excellent Good Poor						

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E. MUNICIPAL POLLUTANT REDUCTI	ION STRATEGIES
E1. Degree of pollutant accumulation in th	e system: 🗌 High 🛛 Medium 🗌 Low 🗌 None
E2. Rate the feasibility of the following po	
Street Sweeping:	High Moderate Low
Storm Drain Stenciling:	High Moderate Low
Catch Basin Clean-outs:	High Moderate Low
Parking Lot Retrofit Potential:	High K Moderate Low
CATCH BASIN SKETCHES	
#1	#2
Notes:	
l	

Streets and Storm Drains  $\mathbf{SSD}$ 

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		NSA-01	
WATERSHED: COCOC Tawar	SUBWATERSHED: WALLER	/ Mult UNIQUE SITE ID: WR-COCCE	
DATE: <u>7/6/08</u>	ASSESSED BY: KR DB	CAMERA ID:	
Map Grid	RAIN IN LAST 24 HOURS Y	XN PIC# 3705	
A. LOCATION			
A1. Street names or neighborhood s MI. Vernon Apartment			
A2. Adjacent land use: 🕅 Resident	ial 🗌 Commercial 📄 Industrial iicipal 🔲 Transport-Related	Institutional	
		nd record its Unique Site ID here NSA -WR-	
B. STREET CONDITIONS			
B1. Road Type: Arterial Co	llector Local Alley	Other:	
<b>B2.</b> Condition of Pavement:	· · · · · ·		
		oken	
B3. Is on-street parking permitted		imber of cars per block: <u>25/building</u>	
<b>B4.</b> Are large cul-de-sacs present?	<u></u>		
<b>B5.</b> Is trash present in curb and gutte		Rating for Accumulation in Gutters	
use the index to the right to record a		Filthy	
	Sediment 1		
Organ	ic Material 1 Litter 1	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
C. STORM DRAIN INLETS AND (			
C1. Type of storm drain conveyance		d	
C2. Percentage of inlets with catch l		u	
Sample 1-2 catch basins per NSA/H		C4. Catch basin #2	
Latitude	U10FD 159 "		
Longitude	-77.07.6:710"	17.021. 17.2."	
LMK #			
Picture #			
Current Condition	Wet 🛛 Dry	Wet Dry	
Condition of Inlet	∑Clear Obstr		
Litter Accumulation			
Organics Accumulation	<u>П</u> ү <u>й</u> м		
Sediment Accumulation	□Y ⊠N		
Sediment Depth (in feet)		<u>l</u> , ft.	
Water Depth	ft.	generation ft.	
Evidence of oil and grease	□Y N		
Sulfur smell	Y N	Y N	
Accessible to vacuum truck		Y N	
D. NON-RESIDENTIAL PARKING	LOT (>2 acres) $N/A$		
D1. Approximate size:a	cres		
D2. Lot Utilization:  Full About half full Empty			
D3. Overall condition of Pavement: Smooth (no cracks) Medium (few cracks) Rough (many cracks) Very Rough (numerous cracks and depressions)			
D4. Is lot served by a storm water treatment practice? Y N If yes, describe:			
D5. On-site retrofit potential:	cellent Good Poor		

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	E. MUNICIPAL POLLUTANT REDUCTION STRATEGIES
	E1. Degree of pollutant accumulation in the system: High Medium K Low None E2. Rate the feasibility of the following pollution prevention strategies:
	Street Sweeping:
	Storm Drain Stenciling:  High Moderate Low
	Catch Basin Clean-outs: Parking Lot Retrofit Potential: High Moderate Low High Low
	CATCH BASIN SKETCHES
	#1 / Fendard #2
$\sim$	and only from the second secon
10	
Burid	/ / / CB#1 / / /
Pg	
	LILL LIST VC32
	Building 57, 58, 59
	Pict 10(3268
	Notes:
	Ru + Z 706 Tis small catch area diraming beland
	PIC # 3706 (715 small catch area draining behind Building [41 50 57.3] [72 26 19.0], leaf lotter & debris
	The words.
:	



WATERSHED: TAVK	SUBWATERSHE	D: CARES	UNIQUE SITE ID: CR-1/54-01
DATE: 1/16/06	ASSESSED BY:	(R/DB	CAMERA ID: 1/5-Conon
MAP GRID	RAIN IN LAST 2		Pic#
A. LOCATION			
A1. Street names or neighborhood s	surveyed:		
	Valle	y Vian Dr. / Ayd.	rew Was
A2. Adjacent land use: K Resident			
	nicipal 🗌 Transp		
A3. Corresponding HSI or NSA fiel	ld sheet? If so, circ	le HSI or NSA and record	rd its Unique Site ID here NSA -0(
B. STREET CONDITIONS			
B1. Road Type: Arterial Co	ollector ALoca	1 Alley Other:	
B2. Condition of Pavement: X Ne	w 🗌 Good 🔲 (	Cracked Broken	New Rough 1010 course
B3. Is on-street parking permitted [	Y N If yes	approximate number of	f cars per block: O
<b>B4.</b> Are large cul-de-sacs present?			
<b>B5.</b> Is trash present in curb and gutt		Index Dating (	
use the index to the right to record a			for Accumulation in Gutters
	Sediment	$\frac{\text{Clean}}{\boxed{1}}$	$\frac{\text{Filthy}}{3  4  5}$
Organ	ic Material	$\square 1$ $\square 2$	
<u></u>	Litter	$\overline{\mathbf{M}}_{1}$ $\overline{\mathbf{D}}_{2}$	$\Box_3 \qquad \Box_4 \qquad \Box_5$
C. STORM DRAIN INLETS AND O	CATCH BASINS	7	
C1. Type of storm drain conveyance	e: 🗌 open 🔽 en	closed 🗌 mixed	
C2. Percentage of inlets with catch	basin storage:	50 🗆 N/A	
Sample 1-2 catch basins per NSA/I	ISI C3	Catch basin #1	C4. Catch basin #2
Latitude	<u>4</u>	<u>• 51 · 54 "</u>	<u>41°51'59</u> "
Longitude	97	<u>° 24 ' 35 "</u>	720 24 26 "
LMK #			
Picture #	10	1-3694	101-3697
Current Condition		🗶 Wet 🗌 Dry	Wet Dry
Condition of Inlet		Clear Obstructed	Clear Obstructed
Litter Accumulation		Тү [Ум	□Y KN
Organics Accumulation		Y N	Y ZN
Sediment Accumulation		Y N	Y V N
Sediment Depth (in feet)		0ft.	ft.
Water Depth		<u>~/).5ft.</u>	<b>~⑦・</b> う ft.
Evidence of oil and grease		Y X N	Y N N
Sulfur smell		Y N	Y N
Accessible to vacuum truck		Y YN	Y N
D. NON-RESIDENTIAL PARKING LOT (>2 acres)			
D1. Approximate size: acres			
D2. Lot Utilization: 🗌 Full 🗌 About half full 🗋 Empty			
D3. Overall condition of Pavement: Smooth (no cracks) Medium (few cracks) Rough (many cracks) Very Rough (numerous cracks and depressions)			
D4. Is lot served by a storm water treatment practice? Y N If yes, describe:			
D5. On-site retrofit potential: Excellent Good Poor			

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E. MUNICIPAL POLLUTANT REDUCTION STRATEGIES
E1. Degree of pollutant accumulation in the system: High Medium Low None
E2. Rate the feasibility of the following pollution prevention strategies:
Street Sweeping: Migh Moderate Low
Storm Drain Stenciling:   High   Moderate   Low     Catch Basin Clean-outs:   High   Moderate   Low
Parking Lot Retrofit Potential: High Moderate Low
#1 How How #2 HATERIET ED HOW HOW #2 HATERIET ED HOW FOR HOW
Notes:

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### APPENDIX C

Photographs on CD



### APPENDIX D

### Vernon Regulatory Review Memorandum

#### MEMORANDUM

- TO: Technical Advisory Committee, Tankerhoosen River Watershed Management Plan and Town of Vernon Land Use Commissioners
- FROM: Erik Mas, P.E., Fuss & O'Neill, Inc.

DATE: June 9, 2008

RE: Stormwater and Low Impact Development (LID) Regulations in the Tankerhoosen River Watershed – Vernon Regulatory Review

#### 1.0 INTRODUCTION

Fuss & O'Neill is working with the Friends of the Hockanum River Linear Park, Inc., in collaboration with its project partners (Town of Vernon Planning Department, Town of Vernon Conservation Commission, North Central Conservation District, Hockanum River Watershed Association, Rivers Alliance of Connecticut, Inc, and the Belding Wildlife Trust) to prepare a Watershed Management Plan for the Tankerhoosen River watershed. The watershed plan will identify action items that can be implemented by the watershed municipalities and private groups to protect and improve the health of the Tankerhoosen River watershed, which is a particularly valuable natural resource, demonstrated by the Class A water quality in the upper regions of the watershed that harbor the Belding Wild Trout Management Area, one of only two such Class I areas east of the Connecticut River.

A key element of the Watershed Management Plan is to identify potential land use regulatory mechanisms (i.e., new or modified land use regulations) that can be implemented by the watershed towns to better manage stormwater runoff associated with land development within the watershed. Many Connecticut communities are in the process of developing new or modified land use regulations that incorporate Low Impact Development (LID) and related stormwater management approaches to address stormwater quantity and quality objectives. Communities, including Vernon, are faced with a mandate to meet State and Federal Phase II stormwater permit requirements under the National Pollutant Discharge Elimination System (NPDES) program, as well as addressing local concerns about the damaging effects of increased impervious cover and uncontrolled stormwater runoff from land development and suburban sprawl. An opportunity exists for the Town of Vernon to develop and implement an ordinance or other regulatory mechanism to satisfy Phase II stormwater regulatory requirements, while also strengthening the existing land use controls to protect natural resources within the Tankerhoosen River watershed.

This memorandum summarizes our review of Vernon's existing land use regulations and related planning documents that pertain to stormwater management and natural resource protection issues, as well as potential approaches for developing regulatory mechanisms to incorporate improved stormwater management, including LID concepts and opportunities to reduce impervious cover, into the Town's land use regulations. The information presented in this



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technical memorandum is intended to facilitate a discussion of these issues during the upcoming workshop meeting with the Tankerhoosen River Management Plan Technical Advisory Committee and the Town of Vernon land use commissioners.

#### 2.0 EXISTING REGULATORY MECHANISMS

Fuss & O'Neill reviewed the following documents and information provided by the Town, which are the primary regulatory mechanisms and related planning documents that address stormwater management and related natural resource protection issues in the Town of Vernon:

- Subdivision Regulations,
- Zoning Regulations,
- Inland Wetland and Watercourses Regulations,
- Plan of Conservation and Development.

#### 2.1 <u>Subdivision Regulations</u>

The Town's subdivision regulations (effective date: May 8, 2007) regulate the division of a tract or parcel of land with the purpose of sale or building development. The subdivision regulations address street and lot layout, water supplies, sanitary sewage facilities, stormwater drainage, utilities, open space, street widths, grades and construction, and other necessary improvements. The following is a summary of specific sections of the subdivision regulations that relate to stormwater management and natural resource protection issues.

- <u>Section 5 Standards for Maps and Plans</u>: This section specifies requirements for maps and plans submitted with subdivision applications, including Site Development Plans, Construction Plans, and Grading Plans. Existing and proposed watercourses and stormwater management systems are required to be shown on the Site Development Plan. Grading Plans are required to include notations and details on erosion and sedimentation control methods.
- <u>Section 6.1.3 General Improvements, Open Space to be Dedicated</u>: The Planning and Zoning Commission may require the set aside of Open Space as part of a subdivision where the Commission finds the existing land applicable to one or more of the following:
  - o The policies and objectives of the Plan of Conservation and Development
  - Areas sensitive to development
  - Prime and important farmland soils
  - Natural Diversity Database Areas as updated by the Connecticut Department of Environmental Protection
  - o Unconsolidated Aquifers and Aquifer Protection Areas
  - Areas indicated for future community facility needs
  - Existing open areas and significant cultural and natural resources
  - o Potential open space system



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- o Land Use Plan and Strategy
- Significant natural and cultural resources inventory
- Viable vernal pools verified by the Town of Vernon Vernal Pool Study or by a qualified licensed professional
- <u>Section 6.1.3.2 General Improvements, Location of Open Space</u>: The protection and preservation of the Hockanum River, Ogden Brook, Tankerhoosen River, Gage's Brook, Railroad Brook, Walker's Reservoir East, Walker's Reservoir West, Valley's Fall's Pond, or a Vernal Pool indentified by the Town, is considered a priority when the parcel being subdivided contains portions of the aforementioned watercourses.

When the parcel being subdivided contains portions of land that would allow for the connection of the Shenipsit Trail, Hockanum River Trail, Risley Pond Trail, Land Trust Trail, Belding Path, Hockanum River Linear Park, Box Mountain Greenway, Talcottville & Tankerhoosen Trail/open space system, Ellington Trail System, Tolland Trail System, Bolton Greenways, Manchester Greenways, other potential greenway, linear park, or trail identified in the POCD or by the Department of Parks and Recreation, the provision and connection of these amenities shall be a priority in the design and or location of Open Space.

- <u>Section 6.1.3.3 General Improvements, Size of Open Space</u>: When Open Space is required, the minimum recommended amount of Open Space to be provided is 12% of the total area of land to be subdivided, 15% of the total area of land if the location of the subdivision is identified in the Land Use Plan and Strategy of the POCD, and 20% of the total land area if the location of the subdivision is identified as a Priority Area for Open Space Protection of the POCD.
- <u>Section 6.1.3.4.3 General Improvements, Open Space Standards</u>: Any land to be dedicated as Open Space shall be left in its natural state by the subdivider and shall not be graded, cleared, disturbed, or used as a temporary or permanent repository for stumps, brush, earth, building materials, debris, detention ponds, or basins.
- <u>Section 6.4 Lot Grading and Drainage</u>: Grading plans shall be submitted where substantial grading is required in order to provide a buildable site and shall employ standards and methods equal to or exceeding those set forth in the Erosion and Sediment Control Handbook (USDA, SCS, Storrs, Conn., 1976). Lot drainage should be coordinated with the general storm drainage patterns for the area, and drainage should be designed to avoid concentrated stormwater to adjacent lots.

Comment: Contains an outdated reference to a previous version of the State Erosion and Sedimentation Control Handbook. Revise the language to reference the current CT Erosion and Sedimentation Control Guidelines, as amended



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• <u>Section 6.5.1.1 - Street Grading and Improvement</u>: Roads shall be related appropriately to the topography, and streets shall be arranged so as to obtain as many as possible of the building sites at, or above, the grades of the streets.

Comments: consistent with fitting the development to the topography. Building sites above the grade of the streets provides opportunity for use of roadside swales. Consider adding a provision to allow elimination of curbing for roads for grades less than 5% to encourage the use of vegetated swales and similar LID stormwater management systems.

• <u>Section 6.6.6 - Cul-de-sac or Dead-End</u>: Cul-de-sac pavement shall be a uniform 45 foot radius except when an island is used, in which case the outside radius shall be 50 feet with an island radius of 20 feet.

Comment: The radius of cul-de sacs should be the minimum required to accommodate emergency and maintenance vehicles. Consider smaller cul-de-sac radius of (30 to 40 feet), or alternative designs such as hammerheads, to reduce impervious cover, such that the design allows for continuous turning movement of the largest fire fighting vehicle used by the Town of Vernon. Also consider encouraging the use of LID bioretention/rain gardens in cul-de-sac islands for stormwater management.

• <u>Section 6.7.1 - Design Standards, Road Width</u>: Table 1 contains minimum pavement width for collector (32 ft), local (28 ft), and limited local roads (28 ft).

Comment: Design residential streets for the minimum required pavement width needed to support travel lanes; on-street parking; and emergency, maintenance, and service vehicle access. Consider pavement widths of between 24 and 28 feet, if such a reduction will not negatively impact public safety or emergency response. Refer to Table 4-3 in the Connecticut Stormwater Quality Manual for potential variation in residential roadway widths based on terrain and development density.

• <u>Section 6.7.2</u> - <u>Design Standards, Curbs</u>: Curbs shall be required on all new streets and shall conform to construction and design standards in the Appendix of the regulations.

Comment: The requirement for curbs on all new roads appears to preclude the use of curbless roads and open vegetated channels for stormwater management.

- <u>Section 6.9.1 Drainage and Storm Sewers, General Requirements</u>: The developer shall be fully responsible for constructing adequate facilities for the control, collection, conveyance and acceptable disposal of storm water, other surface water and subsurface water, whether originating within the sub- division area or in a tributary drainage area.
- <u>Section 6.9.2.2</u> <u>Drainage and Storm Sewers, Location of Stormwater Facilities</u>: The applicant may be required to dedicate either in fee or by drainage or conservation easement, land on both sides of existing watercourses to a distance to be determined by the Commission.



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 <u>Section 6.9.3 - Drainage and Storm Sewers, Drainage Discharge</u>: The discharge of all storm water from a subdivision shall be into suitable streams or other acceptable and suitable storm water drainage facilities having adequate capacity to carry the additional water. Sufficient and adequate facilities shall be constructed on private lots wherever necessary to prevent the flow of surface drainage from the property on which it originates onto adjacent property in sufficient quantity, concentration or velocity to cause damage or create a nuisance on adjoining property.

Comment: The Subdivision Regulations do not include post-development peak flow, volume control, or stormwater quality requirements.

• <u>Section 6.9.3 - Drainage and Storm Sewers, Drainage Design</u>: Designs shall be based on the maximum ultimate development of the entire watershed as permitted by the Zoning Regulations. On watersheds one square mile or over, the design of culverts, bridges and through watercourses shall be based upon not less than a 100-year storm. On watersheds of less than one square mile, the design for the through drainage system shall be for no: less than a 50-year storm. The drainage system for roads, including catch basins, inlets, pipes, underdrains and gutters within or abutting the subdivision shall be designed for not less than a 10-year storm.

Drainage ditches will, in general, not be permitted where it is feasible to install underground pipe.

Comment: This requirements restricts the use curbless roads and roadside vegetated swales in lieu of traditional curb, gutter, and piped drainage.

• <u>Section 6.12.1 - Sidewalks</u>: Sidewalks shall be required in all subdivisions on at least one side of all new streets, unless waived by a three-quarters vote of all members of the Commission, and may be required on both sides at the discretion of the Commission.

Comment: Sidewalks required on two side of the street increase impervious cover. Where practical, consider locating sidewalks on only one side of the street and reduce sidewalk width to 3 or 4 feet. Grade sidewalks to the front yard rather than to the street. Consider using alternative materials such as pavers, stone dust, or pervious concrete.

• <u>Section 6.14 - Certified Erosion and Sediment Control Plan</u>: A soil erosion and sediment control plan shall be submitted with any application for development when the disturbed area of such development is cumulatively more than one-half acre. A single family dwelling that is not a part of a subdivision of land shall be exempt from these soil erosion and sediment control regulations.

Comment: Construction of single family dwellings that disturb an acre or more of land are subject to state and federal NPDES Phase II Stormwater Program requirements. Consider amending the single family exemption to indicate that the exemption only applies to single family dwellings that do not disturb 1 or more acres of land.



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• <u>Section 6.14.3 - Erosion and Sediment Control Plan</u>: a soil erosion and sediment control plan shall contain proper provisions to adequately control accelerated erosion and sedimentation and reduce the danger from storm water runoff on the proposed site based on the best available technology. Such principles, methods and practices necessary for certification are found in the Connecticut Guidelines for Soil Erosion and Sediment Control (1985) as amended.

Plans for soil erosion and sediment control shall be developed in accordance with these regulations using the principles as out-lined in Chapters 3 and 4 of the Connecticut Guidelines for Soil Erosion and Sediment Control (1985), as amended. Soil erosion and sediment control plans shall result in a development that minimizes erosion and sedimentation during construction; is stabilized and protected from erosion when completed; and does not cause off-site erosion and/or sedimentation.

- <u>Section 6.14.6 Conditions Relating to Soil Erosion and Sediment Control</u>: A performance bond may be required for the estimated costs of measures required to control soil erosion and sedimentation, as specified in the certified plan.
- <u>Section 13 Rear Lots</u>: This section includes provisions for greater residential development flexibility, particularly where a site has an unusual lot line or natural resource configuration or where rear lot development would promote or enhance the protection of valuable natural resource features.

Comment: This concept is consistent with LID principles to protect and preserve natural features of a site.

#### 2.2 Zoning Regulations

Site development in the Town of Vernon must comply with the Vernon Zoning Regulations (effective date: May 8, 2007). The following is a summary of specific zoning regulations that relate to stormwater management and natural resource protection issues.

- <u>Section 3.4 General Provisions, Collection and Disposal of Storm Drainage</u>: Proper provision shall be made for collection and disposal of storm water from roofs and parking areas through a pipe system connected to existing storm drains or carried to a natural watercourse or to an on-site area approved by the Town Engineer in compliance with the recommendations of the latest edition of the "Stormwater Quality Manual" of the Connecticut Department of Environmental Protection (DEP).
- <u>Section 3.18 General Provisions, Building Above or Below Center Line of Road</u>: Any lot or parcel of land with the top of foundation more than five (5) feet above or below the center line grade of the road opposite the midpoint of the front foundation wall requires a detailed site plan showing the existing and proposed topography, driveways, storm drainage, and other information.



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- <u>Section 3.25 General Provisions, Sidewalks</u>: Sidewalks shall be installed for all new developments in all areas, unless waived by a three-quarters vote of all members of the Commission.
- <u>Sections 4.1 through 4.25 Use Districts, Setbacks and Lot Dimensions</u>: These sections specify minimum setbacks and lot dimensions for various use districts in the Town of Vernon.

Comment: Minimum setbacks and frontage distances can increase impervious cover. Front yard setbacks, which dictate how far houses must be from the street, can extend driveway length. Large side setbacks and frontage distances influence the road length needed to serve individual lots. Review current setbacks and lot dimensions for potential to relax side yard setbacks and allow narrower frontages to reduce road length and site imperviousness, and to relax front setback requirements to reduce driveway length and lot imperviousness.

- <u>Section 7 Cluster Development</u>: Developers may vary the lot size requirements in Residential 40 and Residential 27 zoning districts, leaving a substantial area free of building lots (i.e., "cluster" development). The land area not allocated to building lots and streets shall be permanently reserved in open space and be readily usable for recreation or conservation.
- <u>Section 12 Off-street Parking and Loading</u>: Section 12.1 specifies parking ratios, which are the number of parking spaces that must be provided for particular uses. The Planning & Zoning Commission may reduce the number of off-street parking spaces which must be installed provided that the required number of spaces is reduced by no more than 20%, the number of spaces will not result in an increase of on-street parking, and the developer pays a fee of \$500 for each space eliminated (fee-in-lieu of parking). Section 12.3 specifies the minimum stall dimensions for off-street parking and truck loading spaces, which already appear to be at or near recommended minimum values.

Comment: Parking ratios typically represent the minimum number of spaces needed to accommodate the highest hourly parking rate at the site. In many cases, parking ratios far exceed parking demand, which refers to the number of spaces actually used for a particular land use. Parking ratios often result in far more spaces than are actually required because ratios are typically set as minimums and not maximums. This results in excessive impervious cover for many land uses. Existing parking ratio should be reviewed to see if lower ratios are warranted and feasible. The required parking ratio for a particular land use should be enforced as both a maximum and minimum to limit excess parking space construction and impervious cover. Consider allowing the Commission to approve parking lots with more spaces than the allowed maximum provided all of the spaces above the maximum number are composed of a pervious surface, and where adequate stormwater management is provided. Also consider parking spaces held in reserve for phased developments, thereby avoiding the situation where unnecessary parking is not constructed if future phases of development do not occur.



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Shared parking is another strategy that reduces the number of parking spaces needed by allowing adjacent land uses to share parking lots, particularly when parking demands occur at different times during the day or week. Section 12.3 appears to allow for shared parking for non-residential uses, although it is unclear if the Town actively promotes shared parking. Where shared parking is used, the Zoning Regulations should require a corresponding reduction in parking spaces.

Also consider adding language to Section 12 that references specific stormwater management and landscape design standards in the Connecticut Stormwater Quality Manual, local stormwater management design manual, other sections of the Zoning regulations, or new/modified local stormwater management and LID regulations.

Model zoning regulations for parking were developed in 2003 for communities in northwestern Connecticut through a study sponsored by the Northwestern Connecticut Council of Governments (NWCCOG), the Litchfield Hills Council of Elected Officials (LHCEO), and the Connecticut DEP. This document provides a good starting point for reviewing and modifying local zoning regulations for parking to address impervious cover and stormwater management issues.

<u>Section 18 — Activities Requiring a Certified Erosion and Sediment Control Plan</u>: A soil
erosion and sediment control plan shall be submitted with any application for
development when the disturbed area of such development is cumulatively more than
one-half acre, except for a single family dwelling that is not a part of subdivision of land,
which is exempt from these soil erosion and sediment control regulations.

Comment: The section of the Zoning Regulations is consistent with the Erosion and Sediment Control Plan requirements (Section 6.14) of the Subdivision Regulations. Construction of single family dwellings that disturb an acre or more of land are subject to state and federal NPDES Phase II Stormwater Program requirements. Consider amending the single family exemption to indicate that the exemption only applies to single family dwellings that do not disturb 1 or more acres of land.

 <u>Section 19 – Rear Lots</u>: This section includes provisions for greater residential development flexibility, particularly where a site has an unusual lot line or natural resource configuration or where rear lot development would promote or enhance the protection of valuable natural resource features.

*Comment:* This section of the Zoning Regulations is consistent with Section 13 of the Subdivision Regulations.

#### 2.3 Inland Wetlands & Watercourses Regulations

The Town of Vernon Inland Wetlands and Watercourses Regulations (effective date: October 2, 2006) regulate the removal or deposition of materials and the construction, obstruction, alteration, or pollution of wetlands and watercourses in the Town. The regulations make provisions for the protection, preservation, maintenance and use of inland wetlands and watercourses by minimizing their disturbance and pollution, maintaining and improving water



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quality in accordance with federal, state, and local authority, and preventing damage from erosion, turbidity, or siltation as well as preventing the loss of beneficial aquatic organisms.

 <u>Section 2 – Definitions, Regulated Activity</u>: Regulated activities include any operation within or use of a wetland or watercourse involving removal or deposition of material, or any obstruction, construction, alteration or pollution, of such wetlands or watercourses. Any clearing, grubbing, filling, grading, paving, excavating, constructing, depositing, or removing of material and discharging of stormwater on the land within the following *upland review areas* is a regulated activity:

Resource	Upland Review Area
Wetland and Watercourse	100 ft.
Hockanum River, Ogden Brook, Tankerhoosen	200 ft.
River, Gage's Brook, Railroad Brook, Walker	
Reservoir West, Walker Reservoir East, and Valley	
Falls Pond	
Other	Agency Discretion*

*The Commission may rule that any activity that alters the existing rate or quality of any stormwater discharge conveyed to a Regulated Area or is likely to impact or affect wetlands or watercourses is a Regulated Activity. The Commission may rule that any other activity whether located within or outside the Regulated Area that is likely to have an affect on the wetlands or watercourses is a Regulated Activity.

Additionally, the Commission may rule that any activity that alters the existing rate or quality of any stormwater discharge conveyed to a Regulated Area or is likely to impact or affect wetlands or watercourses is a Regulated Activity.

- <u>Section 2 Definitions, Significant Activity</u>: A "significant activity" includes any activity involving a deposition or removal of material which will or may have a substantial adverse effect on the Regulated Area or on another part of the inland wetland or watercourse system or an activity which substantially changes the natural channel or may inhibit the natural dynamics of a watercourse system or substantially diminishes the natural capacity of an inland wetland or watercourse to support desirable biological life, prevent flooding, supply water, assimilate waste, facilitate drainage, and/or provide recreation and open space, or any activity which would results in degrading a watercourse or the surface and/or groundwater of an inland wetland, such degradation to be measured by the standards of the Water Compliance Division of the Connecticut Department of Environmental Protection.
- <u>Section 4.3.2 Fee Schedule</u>: A technical review may be required by a consultant for certain regulated activities, including those that are within 200 feet of a watercourse of concern (including the Tankerhoosen River and its major tributaries), regulated activities proposed in a use district where the proposed activity exceeds the impervious coverage thresholds established in such districts, as well as parking space, building square footage, disturbance, and other thresholds.



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- <u>Section 4.3.4 Application Procedure</u>: Any person wishing to undertake a Regulated Activity must submit an application to the Commission. The application must include a map showing the location of the site, the nature and extend of the proposed activity, the location of the Regulated Areas, existing and proposed structures, two-foot elevation contours, all drainage to be engineered, areas where material may be deposited or removed, all proposed construction within Regulated Area, areas of significant vegetation. The application must also include a detailed description of the activity, a map drawn by a licensed surveyor if the proposed activity exceeds ½ acre, the names and address of property owners within 500 feet of the proposed activity, and any reasonable measures which would mitigate the impacts of the Regulated Activity.
- <u>Section 4.5 Evaluation of Proposed Activities</u>: This section specifies the information and criteria upon which the Commission makes its decision on an application. Section 4.5.2 includes factors related to erosion, siltation, and leaching; adverse effects on water quality and aquatic life; the likelihood of any changes in the velocity, volume, or course of water flow, or in the water table, and any consequences such changes may have for the capacity of the wetland or watercourse to help control flooding and to purify and supply water; and the existing and desired quality and use of the water in and near the affected area.

Comment: The evaluation criteria do not contain specific stormwater management standards and do not reference available design guidance such as the Connecticut Stormwater Quality Manual or local design guidance. The regulations also do not require or recommend the use of LID practices to meet stormwater management objectives.

<u>Watercourse Buffers</u>: Section 4.5.2.12 states that the Commission may require the provision of a buffer along a watercourse if proposed activities and/or development may create negative impacts on a watercourse that could be prevented or mitigated by provision of a buffer, as described in "Appendix B. Design Standards Recommended for a Watercourse Protection Buffer." The watercourse buffer design standards state that in areas where vegetated buffers do not exist, or are of limited width, consideration should be given to the creation of a buffer area. Newly created buffers should include canopy or shade trees, shrubs, and herbaceous plant species suited to the local habitat in three (3) zones of plantings. The recommended minimum width of a watercourse buffer is one hundred (100) feet measured horizontally from the banks of the watercourse and fifty (50) feet measured horizontally related to intermittent watercourses.

The recommended watercourse protection area with landscape buffer may be reduced when (1) an engineered stormwater management and pollution control system employing technical best management practices (BMP) in compliance with the Connecticut Department of Environmental Protection (DEP) "Stormwater Quality Manual: is provided to treat run-off from a development site; (2) the site is served by a public sewer system; and (3) a reduction of the river protection buffer depth would not result in a significant potential adverse impact to the watercourse.



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#### 2.4 Plan of Conservation and Development

The Vernon Plan of Conservation and Development (June 2001) presents a detailed strategy for open space conservation and preservation, including increasing the amount of preserved open space as well as creating linkages between open space areas. The Plan identifies priority open space preservation areas along the Hockanum and Tankerhoosen River corridors.

A series of neighborhood meetings were held as an initial phase of the POCD. Several common themes emerged at public meetings. The themes associated with the protection of open space and watercourses included:

- Need to preserve open space for perpetuity in a positive, planned manner with adequate financial resources devoted to this program. A goal of 20% open space might be considered
- Retail development should be limited to prevent Vernon from becoming another Manchester in the Route 84 corridor or like the Berlin Turnpike along other major corridors in Town.
- The water quality of the Town's lakes and rivers as well as groundwater should be protected.

In addition to the currently-implemented Zoning Regulations, Subdivision Regulations, and Inland Wetlands and Watercourses Regulations, the Open Space section of the POCD also recommends adoption of a Hockanum River and Tankerhoosen River Protection Overlay District. Such a district would establish a contiguous and parallel buffer strip on either side of these rivers and would supplement the inland wetland and underlying zoning regulations, with the added provision that the land within the buffer areas and the river itself would remain in a natural, undisturbed state.

#### 3.0 OBSERVATIONS & PRELIMINARY RECOMMENDATIONS

Based on our review of the Town's existing land use regulations and planning documents that pertain to stormwater management and natural resource protection, we offer the following observations and preliminary recommendations for discussion during the upcoming workshop meeting with the Tankerhoosen River Management Plan Technical Advisory Committee and the Town of Vernon land use commissioners.

#### 3.1 Observations

The Town has a number of land use regulations that regulate construction and postconstruction stormwater runoff from new development and redevelopment activities, and provide for protection of natural resources. The local regulations are particularly strong in terms of erosion and sediment control (as well as consistent between the various regulations), open space protection, and regulating activities that can potentially affect wetlands and watercourses, including requirements for watercourse buffers. However, there are several areas where the regulations and design standards and guidance could be strengthened through amendments or



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new regulations to clarify and strengthen stormwater management requirements and better promote the use of LID principles.

#### 1. Stormwater Management Standards and Design Manual

The Town land use regulations do not contain specific stormwater management standards. The Zoning Regulations reference the recommendations and design guidance contained in the Connecticut Stormwater Quality Manual, while the Subdivision Regulations indicate that stormwater systems shall be designed by methods approved by the Town Engineer. The Inland Wetlands and Watercourses Regulations do not contain specific stormwater management standards and do not reference design guidance such as the DEP Stormwater Quality Manual or local design standards, except for instances when the applicant requests reduction in the watercourse buffer width requirements.

While the Connecticut Stormwater Quality Manual contains hydrologic sizing criteria (for water quality, quantity, groundwater recharge, etc.) and detailed design guidance for specific stormwater treatment practices, it does not prescribe a set of stormwater standards due to the lack of state-wide stormwater regulations. The Connecticut Stormwater Quality Manual does contain many LID principles in addition to more traditional end-of-pipe stormwater controls. However, it does not contain more recently developed guidance on LID design methods and clear incentives for developers to use LID over traditional stormwater management methods, such as LID credit systems which have been adopted by communities in recent years. Another drawback of relying solely on the DEP manual is that the information in the manual may eventually become outdated and lacking in areas of new or emerging stormwater management issues, as DEP does not plan to revise the manual in the foreseeable future.

Although the Vernon land use commissions are encouraged to use the Connecticut Stormwater Quality Manual to review applications, an alternative approach is to develop a local stormwater and LID manual to complement the DEP stormwater manual. A local manual could reference applicable sections of the DEP manual and take advantage of the existing design guidance, but also include more detailed guidance and stronger emphasis on LID practices and include specific stormwater standards tailored to the characteristics and needs of the Town. The Town land use regulations could also reference the local stormwater design manual, thereby serving as a single, unifying guidance document that could be updated without the need for major revisions to the Town land use regulations. Several other Connecticut communities have chosen this approach, including Tolland, which has developed a LID and Stormwater Management Design Manual, in addition to amendments to the Tolland Subdivision and Zoning Regulations. The Town of Greenwich is also in the process of revising its outdated drainage manual to incorporate stormwater quality elements and LID principles. Greenwich is also considering adopting a stand-alone ordinance or modifying its local land use regulations to implement the provisions of the new manual.

#### 2. Local Regulatory Mechanism

As indicated in the introduction section, an opportunity exists for the Town of Vernon to develop and implement new or revised regulations to satisfy Phase II stormwater regulatory F:\P2005\0257\A20\Town Regulations and Data\Vernon_Regulatory_Review_Memo_20080605.doc Corres. (MA)



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requirements, while at the same time incorporating LID principles and addressing natural resource protection issues. The Town's existing land use regulations address some of the elements of the post-construction stormwater management "regulatory mechanism" required by the DEP Phase II Stormwater program. However, none of the existing regulations, either individually or collectively, addresses post-construction stormwater management in a comprehensive manner as required by the Phase II program. Additionally, the Town may want to consider regulating stormwater runoff from projects that may not currently be subject to Town land use regulations but which are known to be a source of stormwater quality and drainage issues (such as single family residential redevelopment outside of the Upland Review Area).

Two general approaches exist for implementing a comprehensive stormwater regulatory mechanism to meet Phase II stormwater program requirements and to incorporate LID principles and other specific community objectives. One approach involves developing a new stand-alone stormwater ordinance that could be incorporated into the Vernon Town Code and implemented by a single department or commission such as the Engineering Department. This approach has been used by Stratford and other communities throughout southern New England. An alternate approach would be to implement more comprehensive stormwater management/LID requirements in a new section of the Zoning Regulations and maintain the responsibility for administering the stormwater/LID provisions with the Planning and Zoning Commission. Such an approach has been used by Tolland and Guilford, Connecticut. Elements of both approaches are summarized as follows:

- a. Stand-Alone Stormwater Ordinance
  - Adopt a new stormwater ordinance as part of the Vernon Town Code. The ordinance could be similar to the draft ordinance which is provided in Attachment A of this memorandum and is based upon a model ordinance endorsed by the DEP. Typically, a new stormwater ordinance is a more efficient and effective way to address the Phase II Stormwater program regulatory mechanism requirement than separate revisions to the individual municipal land use regulations that are currently in place. The stormwater ordinance would apply to post-construction stormwater runoff from new development and redevelopment projects that disturb greater than a threshold value that could be selected by the Town. The Phase II General Permit requires that the ordinance apply to projects that would disturb one or more acres. Vernon could consider an alternative applicability threshold to ensure that the requirements would apply to in-fill development projects and other smaller land disturbance activities with the potential for drainage or water guality impacts. The sample draft ordinance provided in Attachment A would apply to all projects that disturb 5,000 square feet or more. Other applicability thresholds could be considered as well. The ordinance should incorporate by reference the technical standards and design guidance contained in a local stormwater manual and/or the Connecticut Stormwater Quality Manual, as amended.



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- The stand-alone stormwater ordinance could be administered by the Engineering Department, which would initially receive stormwater management permit applications for land disturbance activities subject to the ordinance. Stormwater Management Plans would then be reviewed by one or more of the applicable land use commissions (Planning and Zoning Commission or Inland Wetlands Regulatory Commission) with jurisdiction or expertise over the proposed project. Projects that do not fall under the jurisdiction of the Planning and Zoning Commission or the Inland Wetlands Regulatory Commission or the Inland Wetlands Regulatory Commission would be reviewed solely by the Engineering Department for compliance with the ordinance. This administrative structure places responsibility for stormwater management plan review on those agencies that already perform regulatory reviews (P&Z and IW), but consolidates authority for the stormwater ordinance under a single department (Engineering). A drawback to this approach is that the Engineering Department would bear the responsibility for administering the permit program and would likely require additional staff resources.
- The Town could consider creating a dedicated "stormwater inspector" position within the Engineering Department. The stormwater inspector would be responsible for conducting stormwater inspections during and after construction of stormwater facilities in support of the new ordinance, as well as augment the related inspection capabilities of Building Inspector and Zoning Enforcement Officer.
- Short-term funding for administration of the post-construction stormwater ordinance and other elements of the Town's Phase II program would most likely come from taxes and application fees. The Town could investigate implementation of a service charge-based system, such as user fees or a stormwater utility. However, these funding sources are often difficult to implement due to public resistance. Stormwater utilities have been established in Chicopee, Massachusetts, Burlington, Vermont, and elsewhere throughout the U.S. Stonington, Connecticut has investigated the feasibility of a stormwater utility. Several other Connecticut coastal communities are undertaking DEPfunded demonstration projects to explore the feasibility of developing and implementing a stormwater utility. Vernon may also explore the feasibility of a stormwater utility or similar stormwater service charge, although this would likely be a long-term potential funding source.
- b. Incorporation of Stormwater Management/LID Requirements in Zoning Regulations
  - Incorporate a new post-construction stormwater management and LID section into the existing Zoning Regulations. The new section could be similar to the stand-alone example ordinance in terms of applicability thresholds, exemptions, and general stormwater management standards and LID principles. Specific stormwater management standards and design guidance should not be included in the regulations, but rather in a local stormwater manual to avoid the need for



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significant future amendments to the regulations when the standards or design guidance are revised. A copy of the recent amendment to the Town of Tolland Zoning Regulations, which added a new LID section, is included as <u>Attachment B</u> of this memorandum.

• In addition, the Zoning Regulations could be modified to potentially require a Stormwater Management Plan for a proposed activity that only requires a Building Permit, such as a single-family dwelling, if it results in the disturbance of one or more acres (the Phase II permit minimum requirement) or a lower threshold selected by the Town. The following sample language is an excerpt from the Guilford Zoning Regulations:

Stormwater Management Plans shall be prepared for any Site Plan, Coastal Site Plan (CAM) or Special Permit Application in accordance with 273-75.F(3) of this Code. Futhermore, for an Application for Certificate of Zoning Compliance (Building Permit) for any new single family dwelling, the Town Engineer, or the Environmental Planner may require that a Stormwater Management Plan be prepared, all or in part, as required by 273-75.F.(3) when he/she has determined that the development if the single family dwelling may have an adverse impact on stormwater quality.

This approach consolidates stormwater management review within the Planning and Zoning Commission through the existing site plan and special permit application review process. The Subdivision and Inland Wetlands and Watercourses Regulations would also need to be modified to require a Stormwater Management Plan consistent with the Zoning Regulations.

## 3. LID Incentives and Obstacles

Although recent studies demonstrate that LID practices can reduce project costs and improve environmental performance, the perception still exists that site development using LID is more expensive than traditional approaches to stormwater management. Initial project costs may be higher in some cases than those for conventional design. However, significant savings are typically realized due to reduced costs for site grading and preparation, stormwater infrastructure, site paving, and landscaping (USEPA, Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices, EPA publication number 841-F-07-006, December 2007).

Many states and local communities have adopted LID credit systems as an added incentive for developers to use LID, and in particular non-structural measures, to ultimately reduce the size and cost of structural stormwater management systems.

LID Site Design Credits encourage environmentally sensitive site design and LID techniques for managing stormwater that minimize impervious surfaces and preserve natural hydrologic conditions. The credits allow project proponents to reduce or eliminate the structural stormwater BMPs otherwise required to meet certain stormwater standards by implementing LID site design techniques according to a prescribed set of standards. The Tolland LID Design F:\P2005\0257\A20\Town Regulations and Data\Vernon_Regulatory_Review_Memo_20080605.doc Corres. (MA)



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Manual includes such an LID credit system. <u>Attachment C</u> of this memorandum contains an example LID Site Design Credit System that is also being considered by the Town of Greenwich.

Local land use regulations often contain design standards that preclude or limit the use of certain LID practices, particularly the use of curbless roads and roadside vegetated swales. Traditional curb-and-gutter systems convey stormwater with virtually no treatment or attenuation. Open vegetated channels remove pollutants by allowing infiltration and filtering to occur, and encourage groundwater recharge, which can reduce the volume of stormwater generated from a site. Traditionally, the use of curbless roads and vegetated open channels has been discouraged and, in many instances, specifically prohibited in local land use regulations and drainage design manuals, due to concerns over maintenance problems, pavement stability, and potential nuisances such as mosquitoes. Many of these concerns can be addressed through careful design and integration of open channels along streets.

The Vernon Subdivision Regulations contain provisions that limit the use of curbless roads and roadside vegetated swales. The Subdivision Regulations require curbs on all new streets and do not permit drainage ditches where it is feasible to install underground pipe. The Town should evaluate the underlying reasons for these restrictions and determine if the Subdivision Regulations should be amended to encourage the use of curbless roads and roadside swales, consistent with LID principles.

## 4. Local Regulations and Impervious Cover

Impervious cover in a watershed is a strong indicator of the overall quality of streams and aquatic ecosystems. The correlation between watershed impervious cover and stream indicators is due to the relationship between impervious cover and stormwater runoff, since streams and receiving water bodies are directly influenced by stormwater quantity and quality. As impervious cover increases, overall stream health declines.

A goal of LID, which is a form of alternative site design, is to reduce impervious cover, disconnect impervious surfaces from the storm drainage system, and preserve natural site features. Local land use regulations and design requirements were typically not developed with impervious cover in mind. Rather, they evolved from perceived consumer demand, safety concerns, and land availability, often resulting in more impervious cover than is necessary due to expansive parking lots, wide streets, and large-lot subdivisions with little conserved natural areas and open space.

Communities interested in adopting LID and alternative sit design principles need to re-evaluate local land use regulations to overcome these challenges. Based on our review of the Vernon Subdivision and Zoning Regulations, some of the key design parameters that strongly influence impervious cover are already at or near optimal levels (e.g., off-street parking stall dimensions and configuration), while others should be reviewed to determine if further refinement is warranted and feasible (e.g., cul-de-sac design, road width, sidewalks, parking ratios).



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## 3.2 Preliminary Recommendations

This section contains preliminary recommendations based on our review of the existing land use regulations and planning documents, as well as our observations discussed in the previous section. These recommendations are intended to facilitate a discussion with the Technical Advisory Committee and Vernon land use commissioners during the upcoming workshop meeting, and to serve as a starting point and basis for further refinement and implementation.

- 1. Town Design Manual
  - Develop a Town stormwater and LID design manual. A local manual should reference applicable sections of the Connecticut Stormwater Quality Manual to take advantage of the existing design guidance, but also include more detailed guidance and stronger emphasis on LID practices and include specific stormwater standards tailored to the characteristics and needs of the Town (see Recommendation 2). The Town land use regulations should also reference the local stormwater design manual, thereby serving as a single, unifying guidance document that could be updated without the need for major revisions to the land use regulations.
  - Include a section of the design manual that addresses stormwater retrofits for redevelopment and drainage system upgrade and maintenance projects. Stormwater retrofits for residential and commercial redevelopment projects are an important element for the Town's stormwater management strategy given the level of existing development in the Town. Stormwater retrofits also present an opportunity to implement lot-level LID strategies as opposed to larger end-of-pipe controls where land may not be available for stormwater management facilities.
  - Incorporate/reference stormwater quantity and conveyance sections of the Connecticut DOT Drainage Manual for consistency with state drainage standards.
- 2. Stormwater Management Standards
  - Develop and incorporate into the Town stormwater design manual a set of stormwater management standards, which would become regulatory standards referenced by the existing Town land use regulations and/or new stormwater ordinance (see Recommendation 3). Development of stormwater management standards would allow Vernon to establish clearer, specific standards that all projects must meet in order to obtain local land use permits. The stormwater standards could include LID requirements, complement the hydrologic sizing criteria in the *Connecticut Stormwater Quality Manual* and be tailored (using variable minimum performance standards) to protect specific water bodies or sensitive resources in the Town of Vernon. An example set of stormwater management standards is included in <u>Attachment D</u>.



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- 3. New or Modified Stormwater Regulations
  - Develop and implement new or revised stormwater regulations to 1) satisfy Phase II Stormwater Program regulatory requirements, 2) encourage or require LID principles to be implemented for development projects in Vernon, and 3) address other local drainage and natural resource protection issues identified by the Town. Two potential approaches have been identified –1) a new stand-alone stormwater ordinance, or 2) addition/amendments to the existing Zoning Regulations.
  - Form an advisory committee or workgroup consisting of representatives from the various land use commissions and selected Town departments to further evaluate and select the best approach for Vernon, including key decisions regarding:
    - If a new, stand-alone stormwater ordinance is selected, which department or commission will have responsibility for administering the program (i.e., the "Stormwater Authority")?
    - Which projects and activities will the new ordinance apply to (i.e., applicability)?
    - o How will applications be received and reviewed?
    - o Who will be responsible for inspections and enforcement?
    - Will additional staff be required to handle the increased workload to review and process applications?
- 4. Other Amendments to Existing Regulations

## Subdivision Regulations

- Amend Section 6.4 to reference the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, as opposed to the outdated reference to the 1976 version of the Erosion and Sediment Control Handbook.
- Section 6.5.1.1 (Street Grading and Improvement): Consider eliminating the curbing requirement for roads with grades less than 5% to encourage the use of vegetated swales and similar LID practices.
- Section 6.6.6 (Cul-de-sacs): Consider smaller cul-de-sac radius of (30 to 40 feet), or alternative designs such as hammerheads, to reduce impervious cover, such that the design allows for continuous turning movement of the largest fire fighting vehicle used by the Town of Vernon. Also consider encouraging the use of LID bioretention/rain gardens in cul-de-sac islands for stormwater management.
- Section 6.7.1 (Design Standards, Road Width): Consider pavement widths of between 24 and 28 feet, if such a reduction will not negatively impact public safety or emergency response. Refer to Table 4-3 in the Connecticut Stormwater Quality Manual for potential variation in residential roadway widths based on terrain and development density.



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- Section 6.7.2 (Design Standards, Curbs): Consider eliminating the curbing requirement for roads with grades less than 5% to encourage the use of vegetated swales and similar LID practices.
- Section 6.9 (Drainage and Storm Sewers): Modify these sections to reference stormwater management standards and LID principles contained in a stand-alone stormwater ordinance or new section of the Zoning Regulations, and/or the Town stormwater design manual.
- Section 6.9.3 (Drainage Design): Amend this section to allow the use of roadside vegetated swales designed in accordance with the Town stormwater design manual.
- Section 6.12.1 (Sidewalks): Consider requiring sidewalks on only one side of the street and reduce sidewalk width to 3 or 4 feet. Grade sidewalks to the front yard rather than to the street. Consider using alternative materials such as pavers, stone dust, or pervious concrete.
- Section 6.14 (Certified Erosion and Sediment Control Plan): Amend the single family exemption such that the exemption only applies to single family dwellings that do not disturb 1 or more acres of land, which is consistent with the Phase II Stormwater Program regulatory requirement.

## Zoning Regulations

- Section 3.4 (General Provisions): If the Town develops a local stormwater design manual, change the reference to the Connecticut Stormwater Quality Manual to the Town manual.
- Sections 4.1 through 4.25 (Use Districts, Setbacks and Lot Dimensions): Review current setbacks and lot dimensions for potential to relax side yard setbacks and allow narrower frontages to reduce road length and site imperviousness, and to relax front setback requirements to reduce driveway length and lot imperviousness.
- Section 12 (Off-street Parking and Loading): Review existing parking ratios to see if lower ratios are warranted and feasible. The required parking ratio for a particular land use should be enforced as both a maximum and minimum to limit excess parking space construction and impervious cover. Consider allowing the Commission to approve parking lots with more spaces than the allowed maximum provided all of the spaces above the maximum number are composed of a pervious surface, and where adequate stormwater management is provided. Also consider parking spaces held in reserve for phased developments, thereby avoiding the situation where unnecessary parking is not constructed if future phases of development do not occur.



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Clarify Section 12 of the regulations to encourage the use of shared parking. Where shared parking is used, the Zoning Regulations should require a corresponding reduction in parking spaces.

Consider adding language to Section 12 that references specific stormwater management and landscape design standards in the Town stormwater manual and/or the Connecticut Stormwater Quality Manual.

• Section 18 (Activities Requiring a Certified Erosion and Sediment Control Plan): Amend the single family exemption such that the exemption only applies to single family dwellings that do not disturb 1 or more acres of land, which is consistent with the Phase II Stormwater Program regulatory requirement.

### Inland Wetlands and Watercourses Regulations

• Section 4.5 (Evaluation of Proposed Activities): Add language referencing the stormwater management standards and LID principles contained in the Town stormwater manual and/or the Connecticut Stormwater Quality Manual.



# ATTACHMENT A

Draft Model Stormwater Ordinance

## DRAFT

## POST-CONSTRUCTION STORMWATER ORDINANCE (CITY NAME)

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#### 1.0 PURPOSE AND AUTHORITY

The purpose of this ordinance is to protect, maintain and enhance the public health, safety, and general welfare by establishing minimum requirements and procedures to control the adverse impacts associated with post-construction stormwater runoff. Proper management of stormwater runoff will minimize damage to public and private property, reduce the effects of development on land and wetlands, control stream channel erosion, reduce local flooding, improve water quality, and maintain after development, as nearly as possible, the pre-development runoff characteristics.

The provisions of this ordinance are pursuant to Connecticut State Statutes 7-148 (c) (8) (A)¹, 8-2 (a)², 8-25³, and 22a-36 to 22a-45 inclusive⁴, and 8-2(b)⁵ and shall apply to all development occurring within the incorporated area of(City Name), Connecticut. The application of this ordinance and provisions expressed herein shall be the minimum stormwater management requirements and shall not be deemed a limitation or repeal of any other powers granted by State statute. The agencies defined in Section 2.0 as the

¹ Municipal Powers: The municipality has the power to "Provide for the protection and improvement of the environment including, but not limited to, coastal areas, wetlands and areas adjacent to waterways in a manner not inconsistent with the general statutes.

² Regulations: The zoning commission is authorized to adopt regulations "...to secure safety from ...flood and other dangers; to promote health and the general welfare..."

³ Subdivision of land: Authorizes the zoning commission to see "...that proper provision shall be made for... drainage..." and "that proper provision shall be made for protective flood control measures..."

⁴ The Inland Wetlands and Watercourses Act.

⁵ "In any municipality that is contiguous to Long Island Sound the regulations adopted under this section shall be made with reasonable consideration for restoration and protection of the ecosystem and habitat of Long Island Sound and shall be designed to reduce hypoxia, pathogens, toxic contaminants and floatable debris in Long Island Sound. Such regulations shall provide that the zoning commission consider the environmental impact on Long Island sound of any proposal for development."

"Responsible Authority" shall be responsible for the coordination and enforcement of the provisions of this ordinance.

#### **1.1** Incorporation by Reference

For the purpose of this ordinance, the Connecticut Stormwater Quality Manual (as amended) is incorporated by reference by (City Name), Connecticut and shall serve as the official guide for stormwater principles, methods, and practices.

#### 2.0 **DEFINITIONS**

- A. For the purpose of this ordinance, the following definitions describe the meaning of the terms used in this ordinance:
  - (1) "Adverse impact" means any deleterious effect on waters or wetlands, including their quality, quantity, surface area, species composition, aesthetics or usefulness for human or natural uses which are or may potentially be harmful or injurious to human health, welfare, safety or property, to biological productivity, diversity, or stability or which unreasonably interfere with the enjoyment of life or property, including outdoor recreation.
  - (2) "Agricultural land management practices" means those methods and procedures used in the cultivation of land in order to further crop and livestock production and conservation of related soil and water resources.
  - (3) "Applicant" means any person, firm, or governmental agency who executes the necessary forms to procure official approval of a project or a permit to carry out construction of a project.
  - (4) "Aquifer" means porous water bearing geologic formation generally restricted to materials capable of yielding an appreciable supply of water.
  - (5) "BMP (Best Management Practice)" means a structural device or nonstructural practice designed to temporarily store or treat stormwater runoff in order to mitigate flooding, reduce pollution, and provide other amenities.
  - (6) "Clearing" means the removal of trees and brush from the land (i.e., removal of vegetative cover) but shall not include the ordinary mowing of grass
  - (7) "DEP" means the Connecticut Department of Environmental Protection.
  - (8) "Design Manual" means the most current edition of the Connecticut Stormwater Quality Manual that serves as the official guide for the stormwater management principles, methods, and practices.
  - (9) "Detention structure" means a permanent structure for the temporary storage of runoff, which is designed so as not to create a permanent pool of water.
  - (10) "Develop land" means to change the runoff characteristics of a parcel of land in conjunction with residential, commercial, industrial, municipal, or institutional construction or alteration.
  - (11) "Direct discharge" means the concentrated release of stormwater to tidal waters or vegetated tidal wetlands from new development or redevelopment projects in the Critical Area.
  - (12) "Disturb" or "Disturbance" means any activity consisting of the removal of vegetation, topsoil, or overburden, or the placement of topsoil, spoil, or other material, as defined in the Guidelines.

- (13) "Drainage area" means an area that contributes runoff to a single point measured in a horizontal plane, which is enclosed by a ridgeline.
- (14) "Easement" means a grant or reservation by the owner of land for the use of such land by others for a specific purpose or purposes, and which must be included in the conveyance of land affected by such easement.
- (15) "Exemption" means those land development activities that are not subject to the stormwater management requirements contained in this ordinance.
- (16) "Extended detention" means a stormwater design feature that provides gradual release of a volume of water in order to increase settling of pollutants and protect downstream channels from frequent storm events. Methods for designing extended detention BMPs are specified in the Design Manual.
- (17) "Extreme flood volume" means the storage volume required to control those infrequent but large storm events in which overbank flows reach or exceed the boundaries of the 100-year floodplain.
- (18) "Flow attenuation" means prolonging the flow time of runoff to reduce the peak discharge.
- (19) "Grading" means any act by which soil is cleared, stripped, stockpiled, excavated, scarified, filled or any combination thereof.
- (20) "Groundwater recharge volume (GRV)" means that portion of the water quality volume used to maintain groundwater recharge rates at development sites. Methods for calculating the groundwater recharge volume are specified in the Design Manual.
- (21) "Guidelines" means the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, or as may be amended, established pursuant to Section 22a-328 of the Connecticut General Statutes.
- (22) "Infiltration" means the passage or movement of water into the soil surface.
- (23) "Off-site stormwater management" means the design and construction of a facility necessary to control stormwater from more than one development.
- (24) "On-site stormwater management" means the design and construction of systems necessary to control stormwater within an immediate development.
- (25) "Peak runoff attenuation" means controlling by structural practices the volume to prevent an increase in the frequency of out of bank flooding generated by development.
- (26) "Primary treatment practice", as defined in the Design Manual, means a stormwater treatment practice that is capable of providing high levels of water quality treatment as a stand-alone measure.
- (27) "Redevelopment" means any construction, alteration, or improvement exceeding five thousand (5,000) square feet of land disturbance performed on sites where existing land use is commercial, industrial, municipal, institutional or multifamily residential.
- (28) "Responsible Authority" means employees, members, or designees of (City Name) (Agency Name). Other responsible agencies under this ordinance include:
  - (a) The Inland Wetlands and Watercourses Commission for stormwater runoff impacting wetlands and watercourses. (For the purposes of only this paragraph, the definition of "wetlands" and "watercourse" is the definition used in the most current version of the Inland Wetland and Watercourses regulations of (City Name).

- (b) The Engineering Division of the Department of Public Works for stormwater runoff from public roads and sidewalks.
- (c) The Planning Commission and Zoning Commission for all other stormwater runoff.
- (29) "Responsible Official" means (City Name) Director of Public Works ("Director").
- (30) "Retention structure" means a permanent structure that provides for the storage of runoff by means of a permanent pool of water.
- (31) "Retrofitting" means the construction of a structural BMP in a previously developed area, the modification of an existing structural BMP, or the implementation of a nonstructural practice to improve water quality over current conditions.
- (32) "Secondary treatment practice", as defined in the Design Manual, means a stormwater treatment practice that may not be suitable as stand-alone treatment because is not capable of meeting the water quality treatment performance criteria in the Design Manual or has not yet received the thorough evaluation needed to demonstrate the capabilities for meeting the performance criteria in the Design Manual.
- (33) "Sediment" means soils or other surficial materials transported or deposited by the action of wind, water, ice, or gravity as a product of erosion.
- (34) "Site" means:
  - (a) For "new development" any tract, lot or parcel of land or combination of tracts, lots, or parcels of land, which are in one ownership, or are contiguous and in diverse ownership where development is to be performed as part of a unit, subdivision, or project.
  - (b) For "redevelopment" the area of new construction as shown on an approved site plan or the original parcel. Final determination of the applicable area shall be made by the Responsible Authority.
- (35) "Stabilization" means the prevention of soil movement by any of various vegetative and/or structural means.
- (36) "Stormwater management" means the selective use of various management measures to effectively address the adverse water quality and quantity impacts of urban stormwater runoff.
- (37) "Stormwater Management Plan" means a set of drawings or other documents that describe the potential water quality and quantity impacts associated with a development project after construction. A stormwater management plan also identifies selected source controls and treatment practices to address those potential impacts, the engineering design of the treatment practices, and maintenance requirements for proper performance of the selected practices.
- (38) "Stormwater Treatment Practice", as defined in the Design Manual, means a measure constructed for primary treatment or secondary treatment of stormwater runoff.
- (39) "Stream Channel Protection" means restricting peak flows from storm events that result in flow conditions where the stream is flowing to the full extent of its banks so the damaging effects to the channel of increased runoff from urbanization can be reduced. Methods for calculating stream channel protection are specified in the most current edition of the Design Manual.

- (40) "Variance" means the modification of the minimum stormwater management requirements for specific circumstances such that strict adherence to the requirements would result in necessary hardship and not fulfill the intent of this ordinance.
- (41) "Waiver" means the relinquishment from stormwater management requirements by the Responsible Authority for a specific development on a case-by-case review basis.
  - (a) "Quality stormwater management waiver" includes water quality volume and groundwater recharge volume design parameters.
  - (b) "Quantity stormwater management waiver" includes stream channel protection, peak runoff attenuation, and extreme flood volume design parameters.
- (38) "Watercourse" means any natural or artificial stream, river, brook, lake, pond, marsh, swamp, bog, ditch, channel, canal, conduit, culvert, drain, waterway, gully, ravine, wash, and all other bodies of water, natural or artificial, vernal or intermittent, public or private in and including any adjacent area that is subject to inundation from overflow or flood water.
- (39) "Watershed" means the total drainage area contributing runoff to a single point.
- (40) "Water quality volume" means the volume of runoff generated by one inch of rainfall on the site.

#### 3.0 APPLICABILITY

#### 3.1 Scope

No person shall develop land for residential, commercial, industrial, municipal, or institutional uses without having provided stormwater management measures that control or manage runoff from such development, except as provided within this section. The stormwater management measures must be designed consistent with the Design Manual and constructed according to an approved plan for new development or the policies stated in Section 3.4 for redevelopment.

#### 3.2 Exemptions

The following development activities are exempt from the provisions of this ordinance and the requirements of providing stormwater management, except as noted:

- A. Development of single family residential property that results in the disturbance of less than one (1) acre of land, not including projects less than one (1) acre that are part of a larger common plan of development or sale that will ultimately disturb greater or equal to one (1) acre must conform to the requirements presented in Section 4.4.
- B. Agricultural land management practices;
- C. Any activity that will disturb an area less than five thousand (5,000) square feet over the total project;
- D. Maintenance of existing landscaping, gardens or lawn areas associated with a single family dwelling;
- E. Repair or replacement of an existing roof of a single family dwelling;
- F. Construction of utilities (gas, water, electric, telephone, sanitary sewer, etc.) other than drainage, which will not alter terrain, ground cover, or drainage patterns;

G. Emergency repairs to any stormwater management facility or practice that poses a threat to public health or safety, or as deemed necessary by the Responsible Authority.

#### 3.3 Waivers / Watershed Management Plans

- A. Stormwater management quantity control waivers may be granted by the Responsible Authority to projects when the Responsible Authority determines that circumstances exist that prevent the reasonable implementation of quantity control practices.
- B. Stormwater management quality control waivers granted by the Responsible Authority apply to:
  - (1) In-fill development projects where implementation of stormwater management quality controls is not feasible;
  - (2) Redevelopment projects if the requirements of Section 3.4 of this ordinance are satisfied; or
  - (3) Sites where the Responsible Authority determines that circumstances exist that prevent or make unnecessary the reasonable implementation of quality control practices.
- C. Waivers must be requested in writing one week in advance of the regular meeting of the (Responsible Authority Agency Name) in a manner prescribed by the Director of Public Works.
- D. Waivers granted must:
  - (1) Be on a case-by-case basis;
  - (2) Consider the cumulative effects of the waiver policy; and
  - (3) Reasonably ensure the development will not adversely impact stream quality.

#### 3.4 Redevelopment

- A. All redevelopment projects shall reduce existing site impervious area by 20%. Where site conditions prevent the reduction of impervious area, then stormwater management practices shall be implemented to provide quality control for at least 20% of the site's impervious area. The elements and principles of stormwater quality control are noted in the Design Manual.
- B. Where conditions prevent impervious area reduction or on-site stormwater management, the Responsible Authority may consider practical alternatives including:
  - (1) Watershed or stream restoration;
  - (2) Retrofitting; or
  - (3) Other practices approved by Responsible Authority.

#### 3.5 Variance

The Responsible Authority may grant a written variance from any requirement of Section 4.0 (Stormwater Management Criteria), of this ordinance if there are exceptional circumstances applicable to the site such that strict adherence will result in unnecessary hardship and not fulfill the intent of this ordinance. A written request for variance shall be provided to the Responsible Authority and shall state the specific variances sought and reasons for their granting. The Responsible Authority shall not grant a variance unless and until the person developing land provides sufficient justification.

## 4.0 STORMWATER MANAGEMENT CRITERIA

#### 4.1 Minimum Control Requirements

A. The minimum control criteria established in this section and the Design Manual are as follows:

- (1) Shall require that the groundwater recharge volume, water quality volume, and peak runoff attenuation for the 2-year frequency storm event be used to design BMPs according to the Design Manual. Control of the 10-year frequency storm event is required according to the Design Manual. Control of larger storm events may be required at the discretion of the Responsible Authority if a flooding problem exists and downstream floodplain development and conveyance system design cannot be controlled.
- (2) Shall require that the groundwater recharge volume, water quality volume, and stream channel protection sizing criteria be used to design BMPs according to the Design Manual.
- (3) The Responsible Authority may require more than the minimum control requirements specified in this ordinance if hydrologic or topographic conditions warrant or if flooding, stream channel erosion, or water quality problems exist downstream from a proposed project.
- B. Stormwater management and development plans where applicable, shall be consistent with adopted and approved watershed management plans or flood management plans as approved by the DEP.

#### 4.2 Stormwater Management Measures

The structural and nonstructural stormwater management measures established in this ordinance shall be used, either alone or in a combination, in developing a stormwater management plan.

- A. Nonstructural Stormwater Management Measures.
  - (1) The following nonstructural stormwater management practices shall be applied according to the Design Manual to minimize increases in new development runoff:
    - (a) Natural area conservation;
    - (b) Disconnection of rooftop runoff;
    - (c) Disconnection of non-rooftop runoff;
    - (d) Sheet flow to buffers;
    - (e) Grass channels; and
    - (f) Environmentally sensitive development and Low Impact Development (LID) practices;
  - (2) The use of nonstructural stormwater management practices shall be encouraged to minimize the reliance on structural BMPs.
  - (3) The minimum control requirements listed in Section 4.1 of this ordinance may be reduced when nonstructural stormwater management practices are incorporated into site designs according to the Design Manual.
  - (4) The use of nonstructural stormwater management practices may not conflict with existing State or local laws, ordinances, or policies.
  - (5) Nonstructural stormwater management practices used to reduce the minimum control requirements must be recorded and remain unaltered by subsequent property owners. Prior approval from the Responsible Authority shall be obtained before nonstructural stormwater practices are altered.
- B. Structural Stormwater Management Measures.

- (1) The following structural stormwater management practices or "Stormwater Treatment Practices" shall be designed according to the Design Manual to satisfy the applicable minimum control requirements established in Section 4.1 of this ordinance.
  - (a) Primary Treatment Practices, including stormwater ponds, stormwater wetlands, stormwater infiltration practices, stormwater filtering practices, and water quality swales.
  - (b) Combination of primary treatment practices and secondary treatment practices.
  - (c) Multiple secondary treatment practices, at the discretion of the Responsible Authority.
- (2) The performance criteria specified in the Design Manual with regard to general feasibility, conveyance, pretreatment, treatment and geometry, environment and landscaping, and maintenance shall be considered when selecting structural stormwater management practices.
- (3) Structural stormwater management practices shall be selected to accommodate the unique hydrologic or geologic regions of the state.
- C. Alternative structural and nonstructural stormwater management practices may be used for new development water quality control if they meet the performance criteria established in the Design Manual. Practices used for redevelopment projects shall be approved by the Responsible Authority.
- D. For the purposes of modifying the minimum control requirements or design criteria, the owner/developer shall submit at the request of the Responsible Authority an analysis of the impacts of stormwater flows downstream in the watershed. The analysis shall include hydrologic and hydraulic calculations necessary to determine the impact of hydrograph timing modifications of the proposed development upon a dam, highway, structure, or natural point of restricted stream flow. The point of investigation is to be established with the concurrence of the Responsible Authority.

#### 4.3 Specific Design Criteria

The basic design criteria, methodologies, and construction specifications, subject to the approval of the Responsible Authority, shall be those of the Design Manual.

#### 4.4 Single Family Residence Lot Level Controls

Construction of single family residences that results in the disturbance of less than 1 acre of land must minimize or disconnect impervious area runoff from the public storm drainage system by implementing stormwater management measures designed in accordance with the Design Manual. The applicant shall submit evidence on a form prescribed by the Responsible Official that the requirements of Section 4.4 have been met prior to issuance of a building permit.

#### 5.0 STORMWATER MANAGEMENT PLANS

#### 5.1 Review and Approval of Stormwater Management Plans

A. For any proposed development, the developer shall submit a stormwater management plan or waiver application to the Responsible Authority for review and approval, unless otherwise exempted. The stormwater management plan shall contain supporting computations, drawings, and sufficient information describing the manner, location, and type of measures in which stormwater runoff will be managed from the entire development. The Responsible Authority shall

review the plan to determine compliance with the requirements of this ordinance prior to approval. The plan shall serve as the basis for all subsequent construction.

B. Notification of approval or reasons for disapproval or modification shall be given to the applicant within [time frame] after submission of the completed stormwater plan. If a decision is not made within [time frame] the applicant shall be informed of the status of the review process and the anticipated completion date. The stormwater management plan shall not be considered approved without the inclusion of the signature and date of signature of the responsible official on the plan.

#### 5.2 Contents of the Stormwater Management Plan

A. The developer is responsible for submitting a stormwater management plan that meets the design requirements of this ordinance. The plan shall be accompanied by a report that includes sufficient information to evaluate the environmental characteristics of affected areas, the potential impacts of the proposed development on water resources, and the effectiveness and acceptability of measures proposed for managing stormwater runoff. An engineer licensed in Connecticut shall certify on the drawings that all clearing, grading, drainage, construction, and development shall be conducted in strict accordance with the plan. If a stormwater management plan involves direction of some or all runoff off the site, it is the responsibility of the developer to obtain from adjacent property owners any easements or necessary property interests concerning flowage of water. Approval of a stormwater management plan does not create or affect any right to direct runoff onto adjacent property without that property owner's permission.

The minimum information submitted for support of a stormwater management plan or application for a waiver shall be as follows:

- B. Reports submitted for stormwater management plan approval shall include:
  - (1) A brief narrative description of the project;
  - (2) Geotechnicial investigations including soil maps, borings, site-specific recommendations, and any additional information necessary for the proposed stormwater management design;
  - (3) Descriptions of all watercourses, impoundments, and wetlands on or adjacent to the site or into which stormwater directly flows;
  - (4) Hydrologic computations, including drainage area maps depicting pre development and post development runoff flow path segmentation and land use that demonstrate compliance with Section 4.0 of this ordinance;
  - (5) Hydraulic computations;
  - (6) Structural computations;
  - (7) Hydrologic sizing criteria computations according to the Design Manual; and
  - (8) Any other information required by the Responsible Authority.
- C. Construction drawings submitted for stormwater management plan approval shall include the following:
  - (1) A vicinity map;
  - (2) Topography survey showing existing and proposed contours, including the area necessary to determine downstream analysis for proposed stormwater management facilities;
  - (3) Any proposed improvements including location of buildings or other structures, impervious surfaces, storm drainage facilities, and all grading;

- (4) The location of existing and proposed structures and utilities;
- (5) Any easements and rights-of-way;
- (6) The delineation, if applicable, of the 100-year floodplain and any on-site wetlands;
- (7) Structural and construction details for all components of the proposed drainage system or systems, and stormwater management facilities.
- (8) All necessary construction specifications;
- (9) A sequence of construction;
- (10) Data for total site area, disturbed area, new impervious area, and total impervious area;
- (11) A table showing the hydrologic sizing criteria volumes described in the Design Manual;
- (12) A table of materials to be used for stormwater management facility planting;
- (13) All soil boring logs and locations;
- (14) A maintenance schedule;
- (15) Certification by a Connecticut certified engineer that all stormwater management construction will be done according to this plan;
- (16) An as-built certification signature block to be executed after project completion; and
- (17) Any other information required by the Responsible Authority.

#### 5.3 Preparation of the Stormwater Management Plan

- A. A professional engineer licensed in the State shall design and prepare a stormwater management plan as necessary to protect the public and the environment.
- B. If a stormwater treatment practice requires either a dam safety permit from DEP or approval from the Inland Wetlands and Watercourses Agency, the Responsible Authority shall require that a professional engineer licensed in the State prepare the design.

#### 6.0 **PERMITS**

#### 6.1 Permit Requirement

A building permit may not be issued for any parcel or lot unless a stormwater management plan has been approved or waived by the Responsible Authority as meeting all the requirements of this ordinance. Where appropriate, a building permit may not be issued without:

- A. Recorded easements for the stormwater management facility and easements to provide adequate access for inspection and maintenance from a public right-of-way;
- B. A recorded stormwater management maintenance agreement;
- C. A cash bond; and
- D. Permission from adjacent property owners as necessary.

#### 6.2 Permit Fee

A non-refundable permit fee will be collected at the time the stormwater management plan or application for waiver is submitted. The permit fee will provide for the cost of plan review, administration, and management of the permitting process, and inspections by the Responsible Authority of all projects subject to this ordinance. A permit fee schedule shall be established by the Responsible Authority based upon the relative complexity of the project and may be amended from time to time.

#### 6.3 Permit Suspension and Revocation

Any building permit issued by the Responsible Authority may be suspended or revoked after written notice is given to the permittee for any of the following reasons:

- A. Any violation(s) of the conditions of the stormwater management plan approval.
- B. Changes in site runoff characteristics upon which an approval or waiver was granted.
- C. Construction is not in accordance with the approved plan.
- D. Noncompliance with correction notice(s) or stop work order(s) issued for the construction of the stormwater management facility.
- E. An immediate danger exists in a downstream area in the opinion of the Responsible Authority.

#### 6.4 **Permit Conditions**

In granting the plan approval, the Responsible Authority may impose such conditions that may be deemed necessary to ensure compliance with the provisions of this ordinance and the preservation of the public health and safety.

#### 7.0 CASH BOND

The Responsible Authority shall require from the developer a cash bond prior to the issuance of any building permit for the construction of a development requiring a stormwater management facility. The amount of the security shall not be less than the total estimated construction cost of the stormwater management facility. The bond required in this section shall include provisions relative to forfeiture for failure to complete work specified in the approved stormwater management plan, compliance with all of the provisions of this ordinance, and other applicable laws and regulations, and any time limitations. The bond shall not be fully released without a final inspection of the completed work by the Responsible Authority, submission of "as-built" plans, and certification of completion by the Responsible Authority that the stormwater management facilities comply with the approved plan and the provisions of this ordinance. A procedure may be used to release parts of the bond held by the Responsible Authority after various stages of construction have been completed and accepted by the Responsible Authority. The procedures used for partially releasing performance bonds must be specified by the Responsible Authority in writing prior to stormwater management plan approval.

[1) a cash bond posted within the Town treasury or 2) a surety bond that the town could investigate/ approve. Language should be consistent with language currently under review/development by Town Counsel.]

The bond requirement under this ordinance may be waived by the Responsible Authority provided that a bond is required by another agency in the amount equal to or greater than the total estimated construction cost of the stormwater management facilities for the project.

#### 8.0 INSPECTION

#### 8.1 Inspection Schedule and Reports

- A. The developer shall notify the Responsible Official at least 48 hours before commencing any work in conjunction with the stormwater management plan and upon completion of the project when a final inspection will be conducted.
- B. The developer shall retain a professional engineer licensed in the State to conduct inspections. Written inspection reports shall be made of the periodic inspections necessary during construction of stormwater management systems to ensure compliance with the approved plans.
- C. Written inspection reports shall be provided by the developer's engineer to the Responsible Authority on a standard form provided by the Town.
- D. The owner/developer and on-site personnel shall be notified in writing when violations are observed. Written notification shall describe the nature of the violation and the required corrective action.
- E. No work shall proceed until the Responsible Authority approves the work previously completed. The inspector shall provide the developer and Responsible Authority with the results of the inspection reports as soon as possible after completion of each required inspection.

#### 8.2 Inspection Requirements During Construction

- A. At a minimum, inspections shall be made and documented at the following specified stages of construction:
  - (1) For stormwater ponds:
    - (a) Upon completion of excavation to sub-foundation and when required, installation of structural supports or reinforcement for structures, including but not limited to:

- (i) Core trenches for structural embankments
- (ii) Inlet and outlet structures, anti-seep collars or diaphragms, and watertight connectors on pipes; and
- (iii) Trenches for enclosed storm drainage facilities;
- (b) During placement of structural fill, concrete, and installation of piping and catch basins;
- (c) During backfill of foundations and trenches;
- (d) During embankment construction; and
- (e) Upon completion of final grading and establishment of permanent stabilization.
- (2) For stormwater wetlands at the stages specified for pond construction in 8.2 A (1) of this section, during and after wetland reservoir area planting, and during the second growing season to verify a vegetation survival rate of at least 50 percent.
- (3) For infiltration trenches:
  - (a) During excavation to subgrade;
  - (b) During placement and backfill of underdrain systems and observation wells;
  - (c) During placement of geotextiles and all filter media;
  - (d) During construction of appurtenant conveyance systems such as diversion structures, pre-filters and filters, inlets, outlets, and flow distribution structures; and
  - (e) Upon completion of final grading and establishment of permanent stabilization;
- (4) For infiltration basins at the stages specified for pond construction in 8.2 A (1) of this section and during placement and backfill of underdrain systems.
- (5) For filtering systems:
  - (a) During excavation to subgrade;
  - (b) During placement and backfill of underdrain systems;
  - (c) During placement of geotextiles and all filter media;
  - (d) During construction of appurtenant conveyance systems such as flow diversion structures, pre-filters and filters, inlets, outlets, orifices, and flow distribution structures; and
  - (e) Upon completion of final grading and establishment of permanent stabilization.
- (6) For open channel systems:
  - (a) During excavation to subgrade;
  - (b) During placement and backfill of underdrain systems for dry swales;
  - (c) During installation of diaphragms, check dams, or weirs; and
  - (d) Upon completion of final grading and establishment of permanent stabilization.
- (7) For nonstructural practices upon completion of final grading, the establishment of permanent stabilization, and before issuance of use and occupancy approval.
- (8) For secondary treatment practices, including subsurface manufactured devices:

- (a) During excavation to subgrade;
- (b) During placement and backfill of treatment unit;
- (c) During construction of appurtenant conveyance systems such as diversion structures, pre-filters and filters, inlets, outlets, and flow distribution structures; and
- (e) Upon completion of final grading and establishment of permanent stabilization;
- B. The Responsible Authority may, for enforcement purposes, use any one or a combination of the following actions:
  - (1) A notice of violation shall be issued specifying the need for a violation to be corrected if the stormwater management plan noncompliance is identified;
  - (2) A stop work order shall be issued for the site by the Responsible Authority if a violation persists;
  - (3) Bonds or securities may be withheld or the case may be referred for legal action if reasonable efforts to correct the violation have not been undertaken; or
  - (4) In addition to any other sanctions, a civil action or criminal prosecution may be brought against any person in violation of the Stormwater Management subtitle or this ordinance.
- C. Any step in the enforcement process may be taken at any time, depending on the severity of the violation.
- D. Once construction is complete, as-built plan certification shall be submitted by a professional engineer licensed in the State to ensure that constructed stormwater management practices and conveyance systems comply with the specifications contained in the approved plans. At a minimum, as-built certification shall include a set of drawings comparing the approved stormwater management plan with what was constructed the Responsible Authority may require additional information.

#### 9.0 MAINTENANCE

#### 9.1 Maintenance Inspection

- A. The owner (or the developer during construction) shall ensure that all stormwater management systems are inspected for performance of preventative maintenance. Inspection shall occur during the first year of operation and at least once every 3 years thereafter. In addition, a maintenance agreement between the owner and the Responsible Authority shall be executed for privately owned stormwater management systems as described in 9.2 of this section.
- B. The owner (or the developer during construction) shall maintain inspection reports for all stormwater management systems.
- C. Inspection reports for stormwater management systems shall include the following:
  - (1) The date of inspection;
  - (2) Name of inspector;
  - (3) The condition of:
    - (a) Vegetation or filter media;
    - (b) Fences or other safety devices;

- (c) Spillways, valves, or other control structures;
- (d) Embankments, slopes, and safety benches;
- (e) Reservoir or treatment areas;
- (f) Inlet and outlet channels or structures;
- (g) Underground drainage;
- (h) Sediment and debris accumulation in storage and forebay areas;
- (i) Any nonstructural practices to the extent practicable; and
- (j) Any other item that could affect the proper function of the stormwater management system.
- (4) Description of needed maintenance.
- D. After notification is provided to the owner of any deficiencies discovered from an inspection of a stormwater management system, the owner shall have 30 days or other time frame mutually agreed to between the Responsible Authority and the owner to correct the deficiencies. The Responsible Authority shall then conduct a subsequent inspection to ensure completion of the repairs.
- E. If repairs are not undertaken or are not done properly, then enforcement procedures following 9.2 C of this section shall be followed by the Responsible Authority
- F. If, after an inspection by the Responsible Authority, the condition of a stormwater management facility presents an immediate danger to the public health or safety, because of an unsafe condition or improper maintenance, the Responsible Authority shall take such action as may be necessary to protect the public and make the facility safe. Any cost incurred by (City Name) shall be assessed against the owner(s), as provided in Section 9.2 C.

#### 9.2 Maintenance Agreement

- A. Prior to the issuance of any building permit for which stormwater management is required, the Responsible Authority shall require the applicant or owner to execute an inspection and maintenance agreement binding on all subsequent owners of land served by a private stormwater management facility. Such agreement shall provide for access to the facility at reasonable times for regular inspections by the Responsible Authority or its authorized representative to ensure that the facility is maintained in proper working condition to meet design standards.
- B. The applicant and/or owner shall record the agreement in the land records of (City Name).
- C. The agreement shall also provide that, if after notice by the Responsible Authority to correct a violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within a reasonable period of time (30 days maximum), the Responsible Authority may perform all necessary work to place the facility in proper working condition. The owner(s) of the facility shall be assessed the cost of the work and any penalties. This may be accomplished by placing a lien on the property, which may be placed on the tax bill and collected as ordinary taxes by the County/Municipality.

#### 9.3 Maintenance Responsibility

A. The owner of the property on which work has been done pursuant to this ordinance for private stormwater management facilities, or any other person or agent in control of such property, shall maintain in good condition and promptly repair and restore all grade surfaces, walls, drains, dams and structures, vegetation, erosion and sediment control measures, and other protective devices. Such repairs or restoration and maintenance shall be in accordance with approved plans.

B. A maintenance schedule shall be developed for the life of any stormwater management facility and shall state the maintenance to be completed, the time period for completion, and who shall perform the maintenance. This maintenance schedule shall be printed on the approved stormwater management plan.

#### 10.0 APPEALS

Any person aggrieved by the action of any official charged with the enforcement of this ordinance, as the result of the disapproval of a properly filed application for a permit, issuance of a written notice of violation, or an alleged failure to properly enforce this ordinance in regard to a specific application, shall have the right to appeal in a manner prescribed in the regulations and procedures of the Responsible Authority and the State of Connecticut.

#### **11.0 SEVERABILITY**

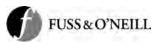
If a court of competent jurisdiction holds any portion of this ordinance invalid or unconstitutional, such portion shall not affect the validity of the remaining portions of this ordinance. It is the intent of (City Name) that this ordinance shall stand, even if a section, subsection, sentence, clause, phrase, or portion may be found invalid.

#### 12.0 PENALTIES

Any person convicted of violating the provisions of this ordinance shall be guilty of a misdemeanor, and upon conviction thereof, shall be subject to a fine of not more than Five Thousand Dollars (\$5,000.00) or imprisonment not exceeding 1 year or both for each violation with costs imposed in the discretion of the court. Each day that a violation continues shall be a separate offense. In addition, the Responsible Authority may institute or cause to be instituted injunctive, mandamus or other appropriate action or proceedings of law to correct violations of this ordinance. Any court of competent jurisdiction shall have the right to issue temporary or permanent restraining orders, injunctions or mandamus, or other appropriate forms of relief.

#### **13.0 EFFECTIVE DATE**

And be it further enacted, that this ordinance shall take effect [number] days from the date it becomes adopted.



# ATTACHMENT B

Tolland Zoning Regulation Amendments Low Impact Development

## ARTICLE XXIV LOW IMPACT DEVELOPMENT

The Town of Tolland requires that Low Impact Development techniques be implemented on all development projects within the boundaries of the Town to protect high quality wetlands, watercourses, open water bodies and other sensitive areas from the impacts of point and non-point sources of storm water due to land development projects.

The concept of Low Impact Development (LID) utilizes many tools to reduce the impact of development on the environment. A primary benefit of LID is a better balance between Conservation of Natural Resources, growth, ecosystem protection and the public health.

## A. Goals of Low Impact Development

- Preserve Open Space within developments by using Cluster and Open Space subdivision standards as found in Section 170-38 of these regulations.
- Incorporate natural site elements (ridge lines, significant trees, open meadows, suitable soils for infiltration, wetlands and streams) into the design as features.
- Minimize land clearing and disturbance and increase natural landscape buffers at the limit of development to improve storm water management.
- Incorporate decentralized storm water management systems in to the site design, treat storm water runoff at its source, disconnect impervious areas.
- Maintain pre-development Times of Concentrations for post-development runoff Maintain sheet flow to the maximum extent possible, avoid concentrating runoff, reduce runoff volumes by infiltration.
- Provide water quality treatment to remove pollutants from storm water, pollution, modify human activities to reduce the introduction of pollutants into the environment.
- Encourage public education and participation in environmental protection within the community

## B. Benefits of Low Impact Development

There are many benefits associated with the use of Low Impact Development for all of the stakeholders in the development field. The three stakeholders in the development field are the environment, the municipality, and the developer. The benefits of LID for each stakeholder are stated below.

- 1. Environmental Benefits:
  - Preserve the biological and ecological integrity of natural systems through the preservation of trees and natural vegetation,
  - Protect the water quality by reducing sediment, nutrient and toxic loads to wetland/watercourse aquatic environments and also terrestrial plants and animals.

- 2. Municipality Benefits:
  - Increase collaborative public/private partnerships on environmental protection by the protection of regional flora and fauna.
  - Balance Growth needs with environmental protections.
  - Reduce municipal infrastructure and utility maintenance costs (roads, and storm water drainage systems)
- 3. Developer Benefits:
  - Reduce land clearing and earth disturbance costs, reduce infrastructure costs (roads, storm water conveyance and treatment systems)
  - Reduce storm water management costs by the reduction of structural components of a drainage system.
  - Increase quality of building lots and community marketability.

## C. Low Impact Development Strategies

- 1. Vegetation and Soils:
  - Retain native forest cover on undeveloped sites, restore vegetated area on previously cleared sites when possible as vegetation captures rainfall, thus increasing evapotranspiration and infiltration.
- 2. Site Design:
  - Define and locate Critical Resource areas, such as wetlands/watercourses, unusual forest features, and soils with moderate to high infiltrative capacities, locate roads, driveways, parking areas, home sites and other buildings away from critical resource areas
  - Minimize impervious surfaces such as roads, driveways, parking areas, and roof tops. Eliminate direct discharges of runoff from impervious areas to wetlands and watercourses
- 3. Storm Water Management:
  - Reduce reliance on the use of traditional storm water collection and conveyance systems (catch basins, pipes, and detention basins) and use small scale storm water management systems, such as bioretention, and rain gardens. Integrate source storm water controls during the design process.
  - Create a site design that slows runoff from rainfall events and increases the amount of time that runoff stays on the site. Incorporate multiple Low Impact Development treatment systems in a treatment train to increase the redundancy of the system to reduce the possibility of system failure
- 4. Education and Maintenance
  - Develop reliable long-term maintenance protocols for LID systems with built in enforcement provisions.

• Educate homeowners, building owners and landscape contractors on the appropriate maintenance requirements for LID systems

#### D. Types of LID Storm Water Systems:

- 1. Vegetated Systems:
  - Vegetated Buffers, Rain Gardens, Bioretention Systems, Water Quality Swales (wet and dry), Grass Filter Strips, Vegetated Level Spreaders, and Vegetated Roofs

#### 2. Infiltration Systems:

- Soil Amendments, Surface Sand Filters, Underground Sand Filters, Gravel Infiltration Trenches, Underground Infiltration Systems, (large diameter perforated PVC pipes and galleries), and Tree Wells
- 3. Surface Treatment Systems:
  - Permeable Pavement, Permeable Concrete, Concrete or PVC Pavers with gravel or grass surface
- 4. Storm Water Ponds and Wetland Systems:
  - Wet Ponds, Multiple Ponds in series, Gravel Wetland Systems, Micropool extended detention pond, Shallow Wetlands, Pond/wetland system, and Extended detention ponds

Refer to Town of Tolland Design Manual for more information on individual systems.

References:

1. Low-Impact Development Design Strategies – An Integrated Design Approach Prepared by: Prince George's County, Maryland; Department of Environmental

Resources, Programs and Planning Division; June 1999 2. Low-Impact Development Hydrologic Analysis

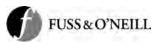
Prepared by: Prince George's County, Maryland; Department of Environmental Resources, Programs and Planning Division; July 1999

3. LOW IMPACT DEVELOPMENT – Technical Guidance Manual for Puget Sound; January 2005

Prepared by Puget Sound Action Team * Washington State University Pierce County Extension

4. 2004 Connecticut Stormwater Quality Manual by the Connecticut Department of Environmental Protection

5. 2002 Connecticut Guidelines for Soil Erosion and Sediment Control by The Connecticut Council on Soil and Water Conservation in Cooperation with the Connecticut Department of Environmental Protection



# ATTACHMENT C

# Example LID Site Design Credit System

### LOW IMPACT DEVELOPMENT (LID) SITE DESIGN CREDIT SYSTEM

## DRAFT

The Low Impact Development (LID) Site Design Credits encourage environmentally sensitive site design and Low Impact Development techniques for managing stormwater that minimize impervious surfaces and preserve natural hydrologic conditions. The credits allow project proponents to reduce or eliminate the structural stormwater BMPs otherwise required to meet Standards 3 and 4 by directing stormwater runoff to qualifying pervious surfaces that provide recharge and treatment.

## Available LID Site Design Credits

There are five types of LID credits that can be obtained:

- Credit 1 Natural Area Conservation,
- Credit 2 Environmentally Sensitive Development,
- Credit 3 Rooftop Runoff Directed to Qualifying Pervious Area,
- Credit 4 Roadway, Driveway or Parking Lot Runoff Directed to Qualifying Pervious Area,
- Credit 5 Sheet Flow to Buffer.

The credits may be used to reduce the required Groundwater Recharge Volume (GRV) and the required Water Quality Volume (WQV) provided that any pervious surfaces used to treat and infiltrate stormwater runoff meet the requirements set forth herein. A proponent of a project that is eligible for the site design credit is required to comply with all other applicable stormwater management standards. The application of these credits does not relieve the design engineer or reviewer from the standard of engineering practice associated with safe conveyance of stormwater runoff and good drainage design.

## Not Eligible for Credits

The LID Site Design Credits may <u>not</u> be applied to reduce the required Groundwater Recharge Volume and the required Water Quality Volume:

- At sites where stormwater runoff is directed to non-permeable soils, such as bedrock and soils classified as Hydrologic Soil Group D; and
- At sites with urban fill, soils classified as contaminated pursuant to the Connecticut Remediation Standards Regulations, and soils with seasonal high groundwater groundwater elevation within 2 feet of the land surface.

Sites with land uses with higher potential pollutant loads are not eligible for Credit No. 2.

Sites with land uses with higher potential pollutant loads are eligible for Credits 3 and 4, provided that no runoff from the areas or activities that may generate runoff with higher potential pollutant loads is directed to the pervious surfaces used to satisfy the credit, and provided further that the proposal satisfies all the other requirements set forth herein.

Runoff from metal roofs is only eligible for Credit 3 when the metal roof is located outside a recharge areas for public water supplies (groundwater and surface water supplies) and the building is not used for industrial purposes.

Runoff from green roofs is not eligible for Credit 3.

1. Natural Area Conservation Credit

A credit is given when natural areas are conserved at development sites, thereby preserving predevelopment hydrologic and water quality characteristics. A simple WQV credit is granted for all conservation areas permanently protected under conservation easements. Under this credit, the design engineer can substract the conservation areas from the total site area when computing the water quality volume. The volumetric runoff coefficient, R, is still based upon the percent impervious cover for the entire site. As an additional incentive, the post-development curve number (CN) for all natural areas permanently protected can be assumed to be woods in good condition when calculating the total site CN.

Minimum Criteria for Credit:

- The area shall not be disturbed during the construction process.
- The area shall be protected from having the limits of disturbance clearly shown on all construction and mitigation plans and shall be delineated in the field.
- The area shall be located within an acceptable conservation easement or other enforceable instrument that provides perpetual protection of the area.
- The area shall be located on the development project site.
- 2. Environmentally Sensitive Development Credit

This credit is given for environmentally sensitive site design techniques that "cluster development" or reduce development scale, to leave a significant amount of the site undisturbed in its natural state. If a site is designed, constructed, operated and maintained in accordance with the requirements of this credit, the credit eliminates the need for structural practices to treat the WQV (Standard 4) and GRV (Standard 5) for low density or cluster residential developments.

## Minimum Criteria for Credit:

## Single Lot Development

- Total site impervious cover is less than 15%.
- Lot size shall be at least 1 acre.
- Rooftop runoff is disconnected in accordance with the criteria listed in Credit 3 and qualifying pervious areas are used to convey runoff from roads and driveways instead of curb and gutter systems in accordance with the criteria listed in Credit 4.

## Multiple Lot Development

- Total site impervious cover is less than 15%.
- Lot size shall be at least 1 acre if clustering techniques are not used.

- If clustering techniques are used, the average lot shall not be less than _____ square feet, which is the minimum residential lot size as identified in the Town of _____ Building Zone Regulations.
- Rooftop runoff is disconnected in accordance with the criteria listed in Credit 3 and qualifying pervious areas are used to convey runoff from roads and driveways instead of curb and gutter systems in accordance with the criteria listed in Credit 4.
- A minimum of 25% of the site is placed in a natural conservation area maintained by an acceptable conservation easement or other enforceable instrument that provides perpetual protection of the area.
- 3. Rooftop Runoff Directed to Qualifying Pervious Area Credit

This credit is available when rooftop runoff is directed to a qualifying pervious area where it can either infiltrate into the soil or flow over it with sufficient time and reduced velocity to allow for filtering. Qualifying pervious areas are relatively flat locations, where the discharge is directed via sheet flow and not as a point source discharge. The credit may be obtained by grading the site to induce sheet flow over specially designed flat vegetated areas or bioretention areas that can treat and infiltrate rooftop runoff. If rooftop runoff is adequately directed to a qualifying pervious area, the rooftop area can be deducted from total impervious area, therefore reducing the required WQV and the size of the structural treatment practices.

Minimum Criteria for Credit:

- To take credit for rooftop disconnection associated with a land use with higher potential pollutant loads, the rooftop runoff must not commingle with runoff from any paved surfaces or activities or areas on the site that may generate higher pollutant loads.
- Disconnection shall cause no basement seepage.
- The contributing area of the rooftop to each disconnected discharge point (gutter pipe) shall not exceed 1,000 square feet.
- The length of the qualifying pervious area shall be 75 feet or greater.
- The width of the qualifying pervious area (in feet) shall be equal to or greater than the roof length. For example, if a roof section is 20 feet wide by 50 feet long (1,000 ft2 roof), the width of the qualifying pervious area shall be at least 50 feet.
- Dry wells, rain gardens, or other filtration/infiltration treatment practices may be utilized to compensate if the disconnection length is less than 75 feet.
- Although they may abut, there shall be no overlap between qualifying pervious areas. For example, the runoff from two 1,000 square foot sections of roof must be directed to separate qualifying pervious areas. They may not be directed to the same area.
- The lot must be greater than _____ square feet.
- The slope of the qualifying pervious area shall be less than or equal to 5%.
- Where provided, downspouts must be at least 10 feet away from the nearest impervious surface to discourage reconnection to the stormwater management system.
- Where a gutter/downspout system is not used, the rooftop runoff must be designed to sheet flow at low velocity away from the structure housing the roof.
- Qualifying pervious areas should be located on relatively permeable soils (HSG "A" and "B"). A soil evaluation by a Registered Professional Engineer or soil scientist is required to confirm the soil type. The soil evaluation shall also confirm that the depth to groundwater is 2 feet or more and that the long-term saturated hydraulic conductivity of

the soil is at least 0.17 inches/hour. The soil evaluation must identify the soil texture, Hydrologic Soil Group and depth to groundwater. For saturated hydraulic conductivity, use Rawls Rates for the actual location where the qualifying pervious area is located.

- If a qualifying pervious area is located in less permeable soils (HSG "C"), the water table depth and permeability shall be evaluated by a Registered Professional Engineer to determine if a spreading device is needed to sheet flow stormwater over vegetated surfaces.
- To prevent compaction of the soil in the qualifying pervious area, construction vehicles must not be allowed to drive over the area. If it becomes compacted, the soil must be amended, tilled and revegetated to restore its infiltrative capacity once construction is complete.
- The qualifying pervious area may not include any wetland areas.
- The qualifying pervious area must be owned or controlled (e.g., drainage easement) by the property owner.
- For those rooftops draining directly to a buffer, only the rooftop disconnection credit or the buffer credit may be taken, not both.
- 4. Roadway, Driveway or Parking Lot Runoff Directed to Qualifying Pervious Area Credit

Credit is given for practices that direct runoff from impervious roads, driveways, and parking lots to pervious areas where plants provide filtration (through sheet flow) and infiltration into the soil can occur. This credit can be obtained by grading the site to promote overland vegetative filtering and infiltration. This credit is available for paved driveways, roads, and parking lots associated with all land uses, except for high-intensity parking lots that generate 1,000 or more vehicle trips per day or runoff not segregated from land uses with higher potential pollutant loads.

Disconnected impervious areas can be subtracted from the site impervious area when computing the WQV. In addition, disconnected impervious surfaces can be used to reduce the GRV.

Minimum Criteria for Credit:

- The maximum contributing impervious flow path length shall be 75 feet.
- The length of the qualifying pervious area must be equal to or greater than the length of the contributing impervious area.
- Dry wells, rain gardens, or other filtration/infiltration treatment practices may be utilized to compensate if the site cannot meet the required length of the qualifying pervious area.
- The width of the qualifying pervious area shall be no less than the width of the contributing impervious surface. For example, if a driveway is 15 feet wide, the qualifying pervious area width shall be no less than 15 feet.
- The entire qualifying pervious area shall be on a slope less than or equal to 5%.
- The impervious area draining to any one discharge location cannot exceed 1,000 square feet.
- Qualifying pervious areas should be located on relatively permeable soils (HSGs A and B). A soil evaluation is required to confirm the soil type. The soil evaluation shall also

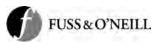
confirm that the depth to groundwater is 2 feet or more, and that the long term saturated hydraulic conductivity of the soil is at least 0.17 inches/hour. For saturated hydraulic conductivity, use Rawls Rates for the actual location where the qualifying pervious area is located.

- If a qualifying pervious area is located in less permeable soils (HSG C), the water table depth and permeability shall be evaluated by a Registered Professional Engineer to determine if a spreading device is needed to sheet flow stormwater over vegetated surfaces.
- To prevent compaction, construction vehicles must not be allowed to drive over the qualifying pervious area. If compacted, the soil must be amended, tilled, and revegetated once construction is complete to restore its infiltrative capacity.
- Runoff from driveways, roadways and parking lots may be directed over soft shoulders, through curb cuts, or level spreaders to qualifying pervious areas. Measures must be employed at the discharge point to the qualifying pervious area to prevent erosion and promote sheet flow.
- The qualifying pervious area may not include any wetland areas.
- The qualifying pervious area must be owned or controlled (e.g., drainage easement) by the property owner.
- For those rooftops draining directly to a buffer, only the rooftop disconnection credit or the buffer credit may be taken, not both.
- 5. Sheet Flow to Buffer Credit

This credit is given when stormwater is effectively treated by a natural buffer to a stream or forested area. Effective treatment is achieved when pervious and impervious area runoff is discharged to a grass or forested buffer via overland flow. The use of a filter strip is recommended to treat overland flow in the green space of a development site. This credit includes subtracting the area draining by sheet flow to a buffer from the total area in the WQV calculation and the area draining to the buffer contributes to the GRV requirement.

Minimum Criteria for Credit:

- The minimum stream buffer width (i.e., perpendicular to the stream flow path) shall be 50 feet as measured from the bank elevation of a stream or the boundary of a wetland.
- The maximum contributing path shall be 150 feet for pervious surfaces and 75 feet for impervious surfaces.
- The average contributing overland slope to and across the stream buffer shall be less than or equal to 5%.
- Runoff shall enter the stream buffer as sheet flow. A level spreading device shall be utilized where local site conditions prevent sheet flow from being maintained.
- The credit is not applicable if rooftop or non-rooftop disconnection is already provided (i.e., no double counting).
- Stream buffers shall remain unmanaged other than routine debris removal.
- Buffers shall be protected by an acceptable conservation easement or other enforceable instrument that provides perpetual protection of the area.



# ATTACHMENT D

# Example Stormwater Management Standards

## STORMWATER MANAGEMENT STANDARDS

## DRAFT

The following stormwater standards establish minimum stormwater management criteria for all development and redevelopment activities in the Town of ______ and reflect the unique natural resources and development characteristics of the Town of ______. These standards encourage groundwater recharge and reduce the potential for stormwater discharges to cause or contribute to pollution of surface water and groundwater. The standards also promote low impact development (LID) techniques, the removal of illicit discharges to stormwater management systems, and improved operation and maintenance of stormwater BMPs. The standards are also consistent with the recommended stormwater management approaches and design guidance contained in the Connecticut Department of Environmental Protection *Connecticut Stormwater Quality Manual.* 

Standard 1: Stormwater Management Practices

Stormwater Management Practices shall be used to meet the conditions below for control of peak flow and total volume of runoff, water quality protection, and maintenance of on-site groundwater recharge.

- A. Stormwater management practices shall be selected to accommodate the unique hydrologic and geologic conditions of the site.
- B. Proponents shall demonstrate how the proposed control(s) will comply with these standards, including the control of peak flow and total volume of runoff, protection of water quality, and recharge of stormwater to groundwater. The proponent must provide design calculations and other back-up materials necessary.
- C. At the discretion of the Stormwater Authority, stormwater management systems shall incorporate designs that allow for shutdown and containment in the event of an emergency spill or other unexpected contamination event.
- D. Pumping of stormwater is prohibited as part of a proposed stormwater management system design because of the significant runoff volumes, maintenance requirements, standby power requirements, and overflows associated with large storms. All other feasible approaches must be investigated to avoid the use of pumps for stormwater management. If the event the Stormwater Authority determines that pumps are necessary, the proponent must submit required backup information as described in the ______ Stormwater Drainage Manual.

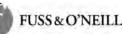
Standard 2: Low Impact Development

A. Project proponents must consider the use of environmentally-sensitive site design and Low Impact Development (LID) techniques to reduce runoff rates, volumes, and pollutant loads. The proponent shall demonstrate why the use of environmentallysensitive site design and LID techniques is not possible before proposing to use traditional, structural stormwater management measures. Such environmentally-sensitive site design and LID techniques include, but are not limited to:

- Identify, map, and preserve the site's natural features and environmentally sensitive areas such as wetlands, native vegetation, mature trees, slopes, drainageways, permeable soils, flood plains, woodlands and soils to the greatest extent possible;
- b. Minimize grading and clearing;
- c. Delineate potential building envelopes, avoiding environmental resource areas and appropriate buffers by clustering buildings and reducing building footprints;
- d. Develop methods to minimize impervious surfaces, and protect and preserve open space. Reduce impervious surfaces wherever possible through alternative street design, such as omission of curbs and use of narrower streets, shared driveways and through the use of shared parking areas;
- e. Lengthen flow paths and maximize sheet flow;
- f. Use nonstructural, low-tech methods including open drainage systems, disconnection of roof runoff, and street sweeping where possible;
- g. Use native plant vegetation in buffer strips and in rain gardens (small planted depressions that can trap and filter runoff);
- h. Use drought-resistant vegetation;
- i. Manage runoff using smaller, decentralized, low-tech stormwater management techniques to treat and recharge stormwater close to the source in place of a centralized system comprised of closed pipes that direct all the drainage from the entire site into one large detention basin.
- j. Integrate management techniques into the site design to create a hydrologically functional lot or development site, including but not limited to grass swales along roads, rain gardens, buffer strips, green roofs, tree box filters, use of amended soils that will store, filter and infiltrate runoff, bioretention areas (rain gardens), rain barrels and cisterns, and permeable pavement.

[NOTE: An "LID Site Design Credit" is available to encourage proponents to incorporate LID techniques in their projects. In exchange for directing runoff from roads and driveways to vegetated open areas, preserving natural areas on development sites, or directing runoff to landscaped or undisturbed areas, the LID credit system allows developers to reduce in size or eliminate the traditional BMPs used to treat and infiltrate stormwater. By using this credit, proponents can reduce the volume of stormwater subject to the Water Quality and Groundwater Recharge Standards. The proposed LID Site Design Credits include:

- Credit 1 Natural Area Conservation
- Credit 2 Environmentally Sensitive Development
- Credit 3 Rooftop Runoff Directed to Qualifying Pervious Area
- Credit 4 Roadway, Driveway or Parking Lot Runoff Directed to Qualifying Pervious Area]



## Standard 3: Protection of Natural Hydrology

[NOTE: These standards are further reinforced through the LID Credit System.]

- A. Site disturbance shall be minimized. The area outside the project disturbance area shall be maintained at natural grade and retaining existing, mature vegetated cover. The project disturbance area shall be depicted on the design, construction, and mitigation plans and shall be delineated in the field prior to commencing land disturbance activities. The project disturbance area shall include only the area necessary to reasonably accommodate construction activities.
- B. Soil compaction on site shall be minimized by using the smallest (lightest) equipment possible and minimizing travel over areas that will be revegetated (e.g., lawn areas) or used to infiltrate stormwater (e.g., bioretention areas). In no case shall excavation equipment be placed in the bottom of an infiltration area during construction.
- C. Development shall follow the natural contours of the landscape. A grading plan shall be submitted as part of the site plan review process showing both existing and finished grades for the proposed development. The original, natural grade of a lot shall not be raised or lowered more than 10 feet at any point for the construction of any structure or improvements. Retaining walls must comply with the requirements of the Building Zone Regulations. Basements that reach grade should be constructed as walk-outs.
- D. No ground disturbed as a result of site construction and development shall be left as exposed bare soil at project completion. All areas exposed by construction, with the exception of finished building, structure, and pavement footprints, shall be decompacted (aerated) and covered with a minimum thickness of six inches of non-compacted topsoil, and shall be subsequently planted with a combination of living vegetation such as grass, groundcovers, trees, and shrubs, and other landscaping materials (mulch, loose rock, gravel, stone).
- E. Priority shall be given to maintaining existing surface waters and systems, including, but not limited to, perennial and intermittent streams, wetlands, vernal pools, and natural swales.
- F. Where roadway or driveway crossings of surface waters cannot be eliminated, disturbance to the surface water shall be minimized, hydrologic flows shall be maintained, there shall be no direct discharge of runoff from the roadway to the surface water, and the area shall be revegetated post-construction.
- G. Roadway and driveway crossings over streams shall comply with the Connecticut Department of Environmental Protection *Stream Crossing Guidelines* (as amended) to accommodate high flows, minimize erosion, and support aquatic habitat and wildlife passage.

## Standard 4: Post-Development Peak Discharge

A. Stream Channel Protection – The two-year, 24-hour post-development peak flow rate shall be (a) less than or equal to 50 percent of two-year, 24-hour storm pre-development

peak flow rate and (b) less than or equal to the one-year, 24-hour storm predevelopment peak flow rate. This Standard may be waived under certain conditions, as described in the *Connecticut Stormwater Quality Manual*.

- B. Conveyance Protection The 10-year, 24-hour post-development peak flow rate shall not exceed the pre-development peak flow rate for all flows within internal and external conveyance systems associated with stormwater treatment practices.
- C. Peak Runoff Attenuation The 10-year and 25-year, 24-hour post-development peak flow rate shall not exceed the pre-development peak flow rate for all flows off-site. This Standard may be waived for sites that discharge to a large river, lake, estuary, tidal waters, or land subject to coastal storm flows, as described in the *Connecticut Stormwater Quality Manual*.
- D. Emergency Outlet Sizing size the emergency outlet to safely pass the postdevelopment peak runoff from the 100-year storm in a controlled manner without eroding the outlet works and downstream drainages and property.
- E. Measurement of peak discharge rates shall be calculated using point of discharge or the downgradient property boundary. The topography of the site may require evaluation at more than one location if flow leaves the property in more than one direction. Calculations shall include runoff from adjacent upgradient properties. A proponent may demonstrate that a feature beyond the property boundary is more appropriate as a design point.
- F. A downstream hydrologic analysis must be performed to determine whether peak flows, velocities, and hydraulic effects are attenuated by controlling the 2-year, 10-year, 25-year and 100-year, 24-hour storms. This analysis must be performed at the outlet(s) of the site and at critical downstream locations (stream confluences, culverts, other channel constrictions, and flood-prone areas) to a confluence point where the site drainage area represents 10% of the total drainage area above that point.
- G. The proponent shall provide pre- and post-development total runoff volumes. The post-development total runoff volume shall be equal to 90 to 110 percent of the predevelopment total runoff volume (based on a 2-year, 10-year, 25-year, and 50-year, 24-hour storms). Calculations shall include runoff onto the project site from adjacent upgradient properties.

### Standard 5: Water Quality

- A. Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspend Solids (TSS). This standard is met when:
  - a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
  - b. Stormwater management practices are sized to treat the Water Quality Volume or Water Quality Flow;
  - c. Appropriate pretreatment is provided in accordance with the ______ Stormwater Drainage Manual; and
  - d. Stormwater treatment practices are maintained as designed.
- B. Compliance with the groundwater recharge requirements under Standard 6 shall be considered adequate to meet the treatment standards specified in 5.A above for the Groundwater Recharge Volume.

Standard 6: Groundwater Recharge

Loss of annual recharge to groundwater shall be eliminated or minimized to the maximum extent practicable through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater management practices, and good operation and maintenance. At a minimum the annual recharge from the post-development site shall approximate the annual recharge from the pre-development or existing site conditions. Infiltration of stormwater runoff from land uses with higher potential pollutant loads near or to a critical area is prohibited. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to a critical area, taking into account site-specific factors.

A. For all areas covered by impervious surfaces, the total volume of recharge that must be maintained shall be calculated as follows:

[NOTE: The NRCS classifies soils into four hydrologic groups A thru D indicative of the minimum infiltration obtained for a soil after prolonged wetting. Group A soils have the lowest runoff potential and the highest infiltration rates, while Group D soils have the highest runoff potential and the lowest infiltration rates. The prescribed stormwater volume that is required to be infiltrated must be determined using existing site conditions and the infiltration rates are set forth below.

## Hydrologic Group Volume to Recharge (x Total Impervious Area)

A gravels, sand, loamy sand or sandy loam 0.6 inches of runoff B silty loam 0.35 inches of runoff	ļ	<u>Hydrologic Group</u>	Volume to Recharge x Total Impervious Area
		A gravels, sand, loamy sand or sandy loa	m 0.6 inches of runoff
	I	3 silty loam	0.35 inches of runoff
C sandy clay loam 0.25 inches of runoff	(	C sandy clay loam	0.25 inches of runoff
D clay, silty clay loam, sandy clay, silty clay 0.10 inches of runoff		D clay, silty clay loam, sandy clay, silty c	ay 0.10 inches of runoff

For each NRCS Hydrologic Group on the site, the volume that must be recharged equals the recharge volume above multiplied by the total area within that NRCS Hydrologic Group

that is impervious. Infiltration of these volumes must be accomplished using appropriate BMPs. These BMPs include bioretention areas, rain gardens, dry wells, infiltration basins, infiltration chambers and galleys, infiltration trenches, leaching catch basins, and vegetated filter strips. Roof runoff may be infiltrated without any treatment, and that infiltrated volume may be used to satisfy the total recharge volume and reduce the water quality volume.

To size infiltration BMPs, proponents may use either the static method or the dynamic infiltration method. The static method assumes that the entire volume is discharged to storage instantaneously, is easy to calculate and generally results in a larger recharge volume than the dynamic method. The dynamic method assumes that that the recharge BMP is infiltrating as it fills and requires certain technical calculations that take this recharge into account when sizing the infiltration BMP.]

- B. When designing infiltration BMPs, adequate subsurface information needs to be obtained. Infiltration systems must be installed in soils capable of absorbing the recharge volume (i.e. not D soils). Surface infiltration structures must be able to drain fully within 72 hours. In addition, there must be at least a three-foot separation from the bottom of the infiltration structure and the seasonal high ground water table or bedrock/ledge. Soils under BMPs shall be scarified or tilled to improve infiltration.
- C. Pre-Treatment Requirements All runoff must be pretreated prior to its entrance into the groundwater recharge device to remove materials that would clog the soils receiving the recharge water. Pretreatment devices shall be provided for each BMP, shall be designed to accommodate a minimum of one-year's worth of sediment, shall be designed to capture anticipated pollutants, and be designed and located to be easily accessible to facilitate inspection and maintenance.
- D. Infiltration of stormwater may be prohibited or subject to additional pre-treatment requirements, at the discretion of the Stormwater Authority, for 1) land uses with higher potential pollutant loads (see Standard 7), 2) areas with soil or groundwater contamination such as brownfield sites, and 3) public drinking water aquifer recharge areas, wellhead protection areas, or water supply intake protection areas.

Standard 7: Land Uses with Higher Potential Pollutant Loads

Stormwater discharges from land uses with higher potential pollutant loads require the use of specific source control and pollution prevention measures and specific stormwater management practices, approved by the Stormwater Authority for such use.

- A. The following uses or activities are considered "high-load areas," with the potential to contribute higher pollutant loads to stormwater, and must comply with the requirements set forth in this section.
  - a. Areas within an industrial site that are the location of activities subject to the DEP Industrial Stormwater General Permit (except where a No Exposure Certification for Exclusion from the General Permit has been executed)
  - b. Vehicle salvage yards and recycling facilities
  - c. Auto fueling facilities (gas stations and other facilities with on-site vehicle fueling)

- d. Exterior fleet storage areas (cars, buses, trucks, public works equipment)
- e. Exterior vehicle service, maintenance and equipment cleaning areas
- f. Commercial parking lots with high intensity use (1,000 vehicle trips per day or more). Such areas typically include fast food restaurants, convenience stores, high turnover (chain) restaurants, shopping centers and supermarkets.
- g. Road salt storage facilities (if exposed to rainfall)
- h. Commercial nurseries
- i. Non-residential facilities having uncoated metal roofs with a slope flatter than 20 percent.
- j. Outdoor storage and loading/unloading of hazardous substances or materials
- k. Facilities subject to chemical inventory reporting under Section 312 of the Superfund Amendments and Reauthorization Act of 1986 (SARA), if materials or containers are exposed to rainfall)
- I. Marinas (service, painting and hull maintenance areas).
- m. Confined disposal facilities, disposal sites, landfills or wastewater residuals landfills if stormwater that may come into contact with the confined disposal area, disposal site, landfill or wastewater residuals landfill may cause or contribute to the discharge of pollutants to wetlands, surface waters or ground water or otherwise result in a release or threat of release
- n. Other land uses and activities as designated by the Stormwater Authority
- B. In addition to implementation of BMPs for designing site-specific stormwater management controls, high-load areas shall provide a stormwater pollution prevention plan (SWPPP) describing methods for source reduction and methods for pretreatment.
- C. If a high-load area demonstrates, through a SWPPP, the use of BMPs that result in no exposure of regulated substances to precipitation or runoff or release of regulated substances, it shall no longer be considered a high-load area.
- D. Infiltration of stormwater from high-load areas are prohibited within critical areas (see Standard 8). Infiltration of stormwater from high-load areas outside of critical areas (see Standard 8) is allowed. For such discharges, proponents should use one pretreatment BMP, one terminal treatment BMP, and one infiltration BMP.
- E. For high-load areas, the following stormwater management practices may be used for treatment only if lined or sealed: Sand Filters/Organic Filters (may also be used for pretreatment), Wet Retention Basins, Detention Basins, Constructed Wetlands, Bioretention Areas, including rain gardens (underdrain required).

Standard 8: Critical Areas

- A. Critical Areas are defined as:
  - a. Shellfish growing areas,
  - b. Bathing beaches,
  - c. Recharge areas for public water supplies (groundwater and surface water supplies),
  - d. Any listed water bodies and wetlands as designated by the Town of ______.

- B. The stormwater BMPs approved for discharges to or near critical areas shall be designed to treat the Water Quality Volume (WQV) for the post-development site. These practices are included in the *Connecticut Stormwater Quality Manual* and the ______ Stormwater Drainage Manual. These stormwater discharges require the use of a treatment train that provides 80% TSS removal prior to discharge. This treatment train shall include at least one pretreatment BMP, one terminal treatment BMP, and one infiltration BMP.
- C. Infiltration of stormwater from high-load areas are prohibited within critical areas.

### Standard 9: Parking

- A. Snow may not be plowed to, dumped in, or otherwise stored within 15 feet of a wetland or waterbody, except for snow that naturally falls into this area. Snow storage areas shall be shown on the site plan to comply with these requirements.
- B. At the discretion of the Stormwater Authority, parking spaces may be required to be constructed of a pervious surface (i.e. grass, pervious asphalt, pervious pavers).
- C. Infrequently used emergency access points or routes shall be constructed with pervious surfaces (i.e. grass, pervious asphalt, pervious pavers).

### Standard 10: Redevelopment

- A. Redevelopment projects are defined to include the following:
  - a. Maintenance and improvement of existing roadways including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems and repaving;
  - b. Development, rehabilitation, expansion and phased projects on previously developed sites; and
  - c. Remedial projects specifically designed to provide improved stormwater management.
- B. Redevelopment of previously developed sites must meet Standards 3, 4, 5, and 6 to the maximum extent practicable as determined by the Stormwater Authority. To make this determination the Stormwater Authority shall consider the benefits of redevelopment as compared to development of raw land with respect to stormwater. All projects involving redevelopment or reuse activities shall also improve existing conditions.
- C. For all redevelopment projects, new stormwater controls (retrofitted or expanded) must be incorporated into the design and result in a reduction in annual stormwater pollutant loads from the site. Proponents of redevelopment projects shall make full use of all opportunities for controlling the sources of pollution and to incorporate environmentally sensitive site design and low impact development techniques. This is particularly important for constrained redevelopment sites where it is not possible to install BMPs that treat the entire water quality volume. All redevelopment projects shall also incorporate measures that will address water quantity issues by reducing the peak and total runoff from the site and by increasing groundwater recharge. Actions to improve existing conditions should address known water quality and water quantity

problems such as documented failures to meet the Surface Water Quality Standards, low stream flow, or repeated flood events.

- D. Redevelopment activities shall not infiltrate stormwater through materials or soils containing regulated or hazardous substances or areas with soil or groundwater contamination.
- E. The portion of a property that is currently undeveloped is not a redevelopment and thus does not fall under Standard 10. Any development on previously undeveloped portions of a property must comply fully with all of the other Stormwater Management Standards.

Standard 11: Construction Erosion and Sediment Control

- A. A plan to control construction related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) must be developed and implemented in accordance with the *Connecticut Guidelines for Soil Erosion and Sediment Control* (as amended).
- B. All development, regardless of the area of disturbance, must implement erosion and sedimentation controls prior to and during construction.

Standard 12: Easements

- A. Where a site is traversed by or requires construction of a watercourse or drainageway, an easement of adequate width may be required for such purpose.
- B. There shall be at least a 10-foot wide permanent maintenance easement corridor on each side of any stormwater management system element, as well as at least a 10-foot wide temporary construction easement corridor contiguous with the boundaries of the permanent easement. For systems using underground pipes, the maintenance easement may need to be wider, depending on the depth of the pipe.

Standard 13: Operation and Maintenance

A. A long-term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed. This plan shall be reviewed and approved as part of the review of the proposed permanent (post-construction) stormwater management system and incorporated in the Stormwater Management Plan. Execution of the O&M Plan shall be considered a condition of approval of a stormwater management permit application. If the stormwater management system is not dedicated to the town pursuant to a perpetual offer of dedication, the Stormwater Authority may require a project proponent to establish a homeowners association or similar entity to maintain the stormwater management system. For high-load areas or activities under Standard 7, the O&M Plan shall include implementation of a SWPPP.

- B. The O&M Plan shall at a minimum identify:
  - a. Stormwater management system(s) owners;
  - b. The party or parties responsible for operation and maintenance including how future property owners will be notified of the presence of the stormwater management system and the requirement for proper operation and maintenance;
  - c. The routine and non-routine maintenance tasks to be undertaken after construction is complete and a schedule for implementing those tasks;
  - d. Plan that is drawn to scale and shows the location of all stormwater BMPs in each treatment train along with the discharge point;
  - e. Description and delineation of public safety features; and
  - f. Estimated operations and maintenance budget.
- C. The stormwater management system owner is generally considered to be the landowner of the property, unless other legally binding agreements are established.
- D. The proponent shall include with the stormwater management permit application a mechanism for implementing and enforcing the O&M Plan. The proponent shall identify the lots or units that will be serviced by the proposed stormwater BMPs. The proponent shall also provide a copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of stormwater BMPs. In the event that the stormwater BMPs will be operated and maintained by an entity, municipality, state agency or person other than the sole owner of the lot upon which the stormwater management facilities are placed, the proponent shall provide a plan and easement deed that provides a right of access for the legal entity to be able to perform said operation and maintenance functions, including inspections.

[NOTE: It is recommended that the stormwater management permit include a condition requiring that the responsible party provide a copy of the permit approval and the legal instrument to each unit or lot owner at or before the purchase of each unit or lot to be serviced by the stormwater BMPs.]

- E. The owner shall keep the O&M Plan current, including making modifications to the O&M Plan as necessary to ensure that BMPs continue to operate as designed and approved. Proposed modifications of O&M Plans including, but not limited to, changes in inspection frequency, maintenance schedule, or maintenance activity along with appropriate documentation, shall be submitted to the Stormwater Authority for review and approval within thirty days of change.
- F. Parties responsible for the operation and maintenance of a stormwater management system shall keep records of the installation, maintenance and repairs to the system, and shall retain records for at least five years.
- G. Parties responsible for the operation and maintenance of a stormwater management system shall provide records of all maintenance and repairs during inspections and/or upon request.
- H. When the responsible party fails to implement the O&M Plan, including, where applicable, the SWPPP, the municipality is authorized to assume responsibility for their

implementation and to secure reimbursement for associated expenses from the responsible party, including, if necessary, placing a lien on the subject property.

Standard 14: Stormwater Management Plan

A. All stormwater management permit applications must include a Stormwater Management Plan. This plan shall document how the proposed project complies with the stormwater standards and must be submitted with the stamp and signature of a Professional Engineer (PE) licensed in the State of Connecticut.

### Standard 15: Illicit Discharges

A. All illicit discharges to the stormwater management system are prohibited.

[NOTE: The stormwater management system is the system for conveying, treating, and infiltrating stormwater on site including stormwater best management practices and any pipes intended to transport stormwater to the groundwater, a surface water, or municipal separate storm sewer system. Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities or facilities:

- Landscape irrigation,
- Uncontaminated groundwater discharges such as pumped groundwater, foundation drains, water from crawl space pumps, and footing drains,
- Irrigation water,
- Lawn watering runoff,
- Residual street wash water,
- Discharges of uncontaminated air conditioner condensate,
- Discharges of flows from fire fighting activities,
- Discharges containing no chemical additives (including chlorine) from the flushing of fire protection systems, and
- Naturally occurring discharges such as rising groundwater, uncontaminated groundwater infiltration, springs, and flows from riparian habitats and wetlands.]