Town of Germantown

Columbia County, New York

Road-Stream Crossing Inventory & Management Plan

Produced by:

Cornell Cooperative Extension Columbia and Greene Counties

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Cornell Cooperative Extension Columbia and Greene Counties

NEW YORK STATE OF OPPORTUNITY | Hudson River Estuary Program

A Program of the New York State Department of Environmental Conservation

NEW YORK STATE WATER RESOURCES INSTITUTE

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Executive Summary – December 2023

Over the past several years, Cornell Cooperative Extension of Columbia and Greene County has assessed hundreds of road-stream crossings (i.e.culverts and bridges) to identify barriers to fish and wildlife passage and flood risks. CCE has worked with local conservation experts to prioritize potential replacement projects based on their potential to restore stream habitat. We have also formed a partnership with the Cornell University's New York State Water Resource's Institute to model the risk-of-failure for culverts. The output from this model tells us how likely it is for each culvert to fail (i.e. flood the road) in different storm scenarios.

Now we turn to you—town staff and officials—to work with us to identify high-priority replacement projects based on the results of our field assessments and modeling, and your first -hand knowledge of past floods, ongoing maintenance, and structure condition. This document is the basis for that collaboration. It contains an inventory of 55 known road-stream crossings in the Town of Germantown that have been assessed in the field, and the results of flood risk modelling for 44 of these culverts. After you have had some time to review these results, it will be useful to compare the culverts that were prioritized for aquatic organism passability to those culverts that you as a town have prioritized, considering these questions:

1. Which structures regularly flood the road?
2. Has water over the road or other crossing failure blocked access for Town residents to essential services, such as Fire/EMS? If not, are you aware of any crossings where failure would block access for essential services?
3. Which structures require regular sediment, debris and/or ice removal?
4. Are you aware of structures that are in poor condition and need to be repaired or replaced?

This Culverts Inventory and Management Plan will be a tool the Town can use to take advantage of every opportunity to reduce flood risk and improve stream habitat connectivity at road/stream crossings, including capital planning and regular maintenance, grant programs, and recovery operations in the wake of the next flood. We will continue to inform the Town of future funding opportunities.

We hope that you find this document useful throughout the prioritization process, and we welcome your feedback.

Partners, Funders and Advisors

- Town of Germantown
- NYS DEC Hudson River Estuary Program
- NYS Water Resources Institute at Cornell University
- Cornell Cooperative Extension of Columbia and Greene Counties
- Trout Unlimited

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Cornell Cooperative Extension
Columbia and Greene Counties

TROUT UNLIMITED

Disclaimer:
Funding for the project was provided by Hudson River Estuary Program of NYS Department of Conservation with support from the NYS Environmental Protection Fund, in cooperation with NYS Water Resources Institute at Cornell University. The viewpoints expressed here do not necessarily represent those of NYS DEC, nor does mention of trade names, commercial products, or causes constitute endorsement or recommendation for use.

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AQUATIC CONNECTIVITY

Identifying Barriers to Organisms and Hazards to Communities

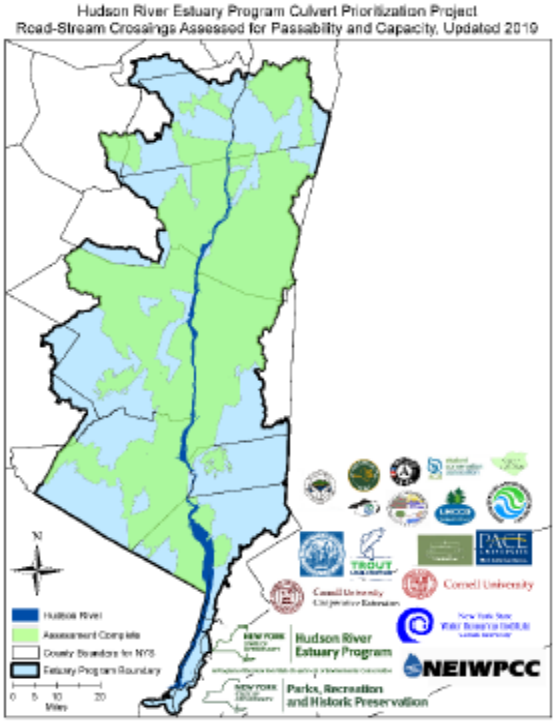
Problem Road Culverts

Poorly designed and undersized culverts are barriers to aquatic organisms and hazards to communities during storms. Streams are linear habitats for aquatic and semi-aquatic species such as American eel, herring, stream salamanders, turtles and crayfish. Road crossings can fragment streams into small pieces, preventing organisms from accessing critical habitats.

Culverts also may be infrastructure liabilities and flooding hazards for communities. During storms, undersized or improperly installed culverts can become clogged with debris or overwhelmed, leading to road flooding, stream bank erosion, or even washout of the whole road.

Culverts such as this these can constrict the natural flow of the stream, have a perched outlet that only strong swimmers can jump and contain no natural streambed. Many culverts and dams fragment

Municipalities can receive help prioritizing culverts that could be upgraded, benefitting aquatic organisms and communities' bottom lines.



Studies have found that about two-thirds of crossings are not fully passable to aquatic organisms. The NYSDEC Hudson River Estuary Program, other NYSDEC branches, Soil and Water Conservation Districts, and interested county and local partners are working to reconnect tributaries within the Estuary watershed by surveying and prioritizing impassable and undersized culverts. Road crossings with unnatural stream bottoms, a perched outlet where a culvert adds an unnatural step to the stream, or other conditions are often barriers to organisms that need to go up and down streams.

Cornell University hydrologists model each crossing for the maximum storm interval (return period) the crossing could pass without spilling over the road. Undersized culverts are more likely to flood the road and washout during large storms. Emergency replacement of failed culverts costs more money and disrupts essential services such as hospital access during flood events. **This project connects interested communities with funding sources to replace impassable, undersized culverts with fully passable, properly sized culverts.**

Empowering Communities

After the assessment work, communities have data on each crossing's passability and capacity scoring information. This data is also available on the Cornell WRI Aquatic Connectivity Map and the North Atlantic Aquatic Connectivity Collaborative database. Estuary Program staff are available for technical assistance and presentations to help communities use the information. Culvert assessments have been conducted in approximately 54.4% of the Hudson River Estuary Program boundary with the help of many partners.

Scenic Hudson Land Trust received a grant to improve the aquatic organism passability and reduce the flooding hazard of this vital piece of infrastructure.

To help communities reconnect their streams and proactively remove flooding hazards, Estuary Program grants can fund these planning and mitigation steps.

1.) **Assess Culverts and Bridges** for aquatic organism passability and storm capacity by partner organizations or Estuary Program staff.

2.) **Prioritize Problem Culverts** within a management plan. After the crossings have been assessed and modeled, municipalities can rank crossings by passability, capacity and local needs. This document can be added to a Natural Resource Inventory or Hazard Mitigation Plan.

3.) **Design Replacements** through conceptual or shovel-ready engineering plans. This process also addresses relevant permits required for a construction mitigation project.

4.) **Fix Problem Culverts** by upgrading infrastructure to be fully passable to organisms and reduce flooding hazards.

Removing harmful and unnecessary stream barriers will benefit our resident and migratory fish, as well as all the other organisms that use our streams. New York has seen a dramatic increase in the amount of rain falling during large storms, and climate change projections suggest that will continue. Planning for fully passable crossings for organisms also means planning for structures capable of handling more frequent and intense storm events. This project gives communities a clear understanding of where problem stream barriers are and provides funding to fix them.

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Partners have assessed over 10,000 crossings

- 20% of these are substantial barriers to aquatic organisms
- 71% of crossings are undersized
- Problems are more pronounced for locally owned roads

Methods & Procedures

Overview

Cornell Cooperative Extension of Columbia and Greene Counties (CCE) was awarded funding through the New York State Department of Environmental Conservation Hudson River Estuary Program develop a road-stream crossing in-ventory, prioritization, and management plan for the Town of Germantown. Assessments of these road stream crossings were completed by CCE-CG and Hudson Riv-er Estuary Program staff. These assessments were compiled into this town-wide inventory document to rank the top 10 highest priority crossings necessary for right-sizing in terms of: 1) aquatic passa-bility generated through NAACC and 2) flood risk generated through Cornell University Water Re-sources Institute. Additionally, Town of Germantown staff provided input and feedback on their on priori-ty crossings based on their desires to reduce flooding and property damage, and increase access for fish and riparian organisms. A total of 55 road-stream crossings were assessed and included in this inventory.

Assessment Protocol

Field crews completed UMass and NAACC L1 and Lead Observer certifications to assess road stream crossings. This included a 3-hour online training, in-person field training, and shadowing an experienced lead observer at 20 road stream crossings. The field crews utilized the NAACC database to locate predicted stream crossings (through streamcontinuity.org). Lead observers collected data on each stream crossing and uploaded it to the server. The L1 coordinator reviewed their data and approved the assessments in the server. Data was uploaded to the NAACC database for the public to view and generated an aquatic passability score. Raw NAACC and UMass data were submitted to Cornell University Water Resources Institute for flood risk analysis. Raw data received from Cornell were input into the flood risk data tables. As explained by Cornell Graduate students, the Cornell model output detects a discrepancy between runoff from the watershed and overall culvert capacity. Exceptions to the model include: crossings >20ft wide (which the highway administration considers bridges), assessments with incomplete or partially inaccessible data, and any crossings that produce an incorrect watershed area (<0.01km^2) due to inaccurate DEM resolution.

Inventory Document and Management Plan

The Housatonic Valley Association (HVA) developed a template for the inventory document which included structure data, crossing data, and images. CCE input and sorted the data into the inventory document. Local knowledge was integrated into the ranking process through a series of stakeholder meetings. The top ten highest priority crossings for flood risk and aquatic organism passability were identified and highlighted in the document. As this is a working document, the Town is encouraged to update the document with new crossings and images as needed.

*Note: Several image boxes and data fields may appear empty or read "pending approval." As this is a working document, those fields can be updated by Town staff as needed. Fields missing data include: Road Images, Flood Risk Data Tables (data is not yet ready from Cornell University), and some Inlet/ Outlet Images (unable to take images due to inaccessibility from vegetation or private property boundary).

Scoring Road-Stream Crossings as Part of the North Atlantic Aquatic Connectivity Collaborative (NAACC)

Adopted by the NAACC Steering Committee November 10, 2015

Introduction

The North Atlantic Aquatic Connectivity Collaborative (NAACC) was launched in 2015 with a rapid assessment protocol for evaluating aquatic passability at road-stream crossings and an online database (https://www.streamcontinuity.org/cdb2) for storing and scoring data collected using this protocol. Two scoring systems are proposed to evaluate aquatic passability at road-stream crossings. The first is a coarse screen for use in classifying crossings into one of three categories: "Full AOP" (Aquatic Organism Passage), "Partial AOP," and "No AOP." The second system is an algorithm for computing an aquatic passability score, ranging from 0 (low) to 1 (high), for each road -stream crossing. These two scoring systems are not particular to any taxonomic or functional group but instead seek to evaluate passability for the full range of aquatic organisms likely to be found in rivers and streams.

NAACC Coarse Screen

Table 1 below identifies characteristics and conditions that allow crossings to be classified as providing "Full AOP," "Reduced AOP," or "No AOP."

Table 1. NAACC Coarse Screen

Metric	Flow Condition	Crossing Classification		
		Full AOP	Reduced AOP	No AOP
		If all are true	*If any are true*	*If any are true*
Inlet Grade		At Stream Grade	Inlet Drop or Perched	
Outlet Grade		At Stream Grade		Cascade, Free Fall onto Cascade
Outlet Drop to Water Surface		= 0		≥ 1 ft
Outlet Drop to Water Surface/ Outlet Drop to Stream Bottom				> 0.5
Inlet or Outlet Water Depth	Typical-Low	> 0.3 ft		< 0.3 ft w/Outlet Drop to Water Surface > 0
	Moderate	> 0.4 ft		< 0.4 ft w/Outlet Drop to Water Surface > 0
Structure Substrate Matches Stream		Comparable or Contrasting		
Structure Substrate Coverage		100%	< 100%	
Physical Barrier Severity		None	Minor or Moderate	Severe

The primary objective of the coarse screen is to identify those crossings that are likely to be a barrier to most or all species and those that are likely to provide something close to full aquatic organism passage. If it is necessary to get a better feel for how bad those crossing are that are labeled as "reduced AOP" one can use the numeric scoring system.

NAACC Numeric Scoring System

The numeric scoring algorithm is based on the opinions of experts who decided both the relative importance of all the available predictors of passability as well as a way to score each predictor. Scoring involves three steps: (1) generating a component score for each predictor variable, (2) combining these predictions with a weighted average to generate a composite score for the crossing, and (3) assigning a final score based on the minimum of the composite score or the component score for the *outlet drop* variable.

Variables Used

Crossing assessments are generally done during "typical low-flow conditions." Some variables are important for assessing conditions at the time of the survey; others provide indirect evidence of likely conditions at higher flows.

Inlet Grade: The position of the structure invert relative to the stream bottom at the inlet.

Outlet Drop: Outlet drop is based on the variable *Outlet Drop to Water Surface* unless the value for *Water Depth Matches Stream* = "Dry" in which case outlet drop is based on the variable *Outlet Drop to Stream Bottom*.

Physical Barriers: This variable covers a wide variety of circumstances ranging from obstructions to dewatered culverts or bridge cells that represent physical barriers to aquatic organism passage.

Constriction: The relative width of the crossing compared to the width of the stream. "Severe" = <50%, "Moderate" = 50-100%; other options include "Spans Only Bankfull/Active Channel" and "Spans Full Channel & Banks." *Constriction* is an indirect indicator of potential velocity issues at higher flows.

Water Depth: Water depth in the structure relative to water depths found in the natural channel at the time of survey.

Water Velocity: Water velocity in the structure relative to water velocities found in the natural channel at the time of survey.

Scour Pool: Presence/absence of a scour pool at the crossing outlet and size relative to the natural stream channel. *Scour Pool* is an indirect indicator of potential velocity issues at higher flows. *Scour pool* is included solely as an indicator of velocities at higher flows. It is not based on the effects of the pool itself which can actually be positive for fish passage.

Substrate Matches Stream: An assessment of whether the substrate in the structure matches the substrate in the natural stream channel. *Substrate Matches Stream* is used to evaluate how a discontinuity in substrate might inhibit passage for species that either use substrate as the medium for travel (e.g., mussels) or require certain types of substrate for cover during movements (e.g., crayfish, salamanders, juvenile fish).

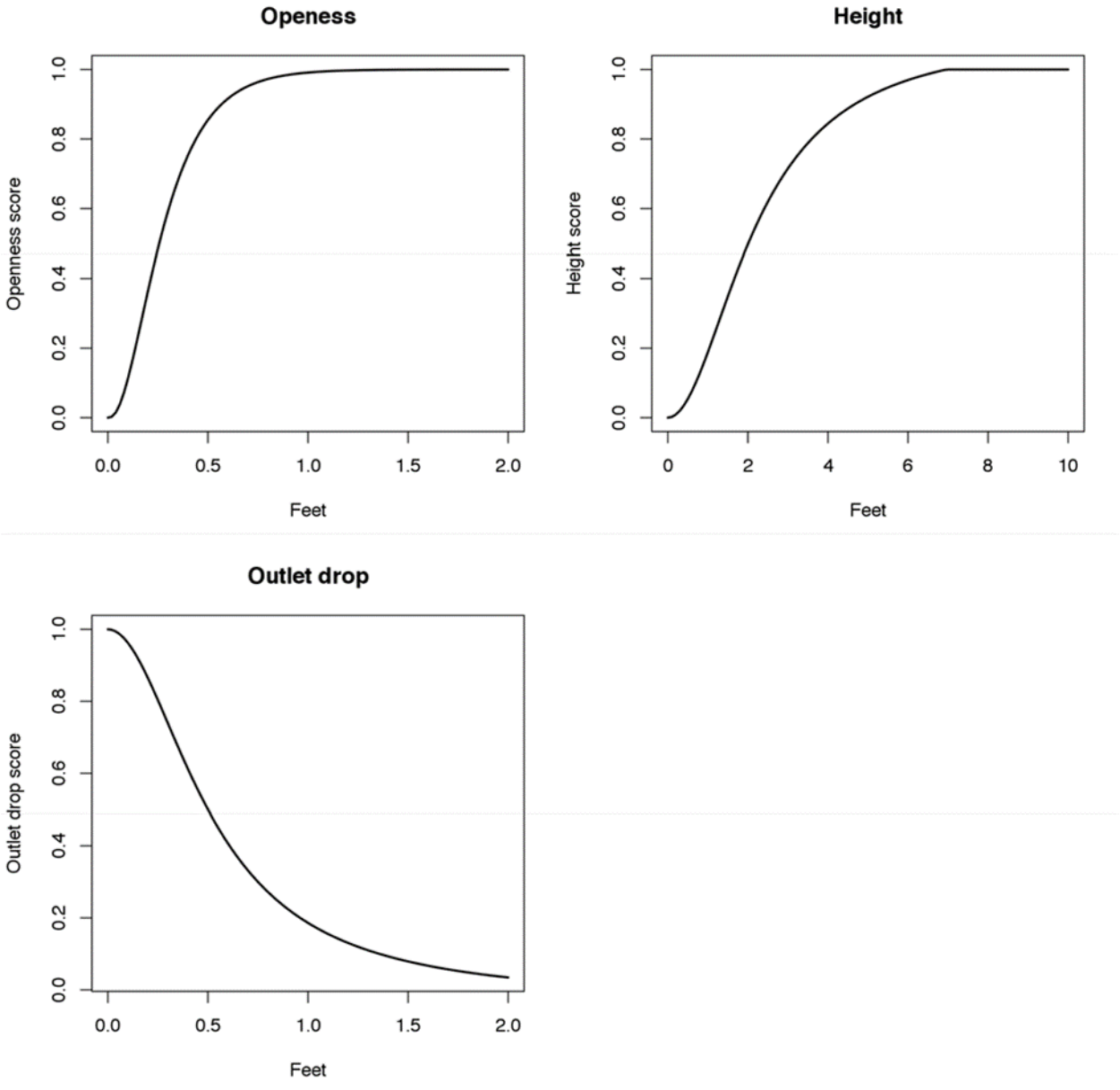

Figure 1. Continuous predictor variables

Table 2. Component scores for categorical variables used in calculating the crossing

parameter	level	score
Constriction	severe	0
Constriction	moderate	0.5
Constriction	spans only bankfull/active channel	0.9
Constriction	spans full channel and banks	1
Inlet grade	at stream grade	1
Inlet grade	inlet drop	0
Inlet grade	perched	0
Inlet grade	clogged/collapsed/submerged	1
Inlet grade	unknown	1
Internal structures	none	1
Internal structures	baffles/weirs	0
Internal structures	supports	0.8
Internal structures	other	1
Outlet armoring	extensive	0
Outlet armoring	not extensive	0.5
Outlet armoring	none	1
Physical barriers	none	1
Physical barriers	minor	0.8
Physical barriers	moderate	0.5
Physical barriers	severe	0
Scour pool	large	0
Scour pool	small	0.8
Scour pool	none	1
Substrate coverage	none	0
Substrate coverage	25%	0.3
Substrate coverage	50%	0.5
Substrate coverage	75%	0.7
Substrate coverage	100%	1
Substrate matches stream	none	0
Substrate matches stream	not appropriate	0.25
Substrate matches stream	contrasting	0.75
Substrate matches stream	comparable	1
Water depth	no (significantly deeper)	0.5
Water depth	no (significantly shallower)	0
Water depth	yes (comparable)	1
Water depth	dry (stream also dry)	1
Water velocity	no (significantly faster)	0
Water velocity	no (significantly slower)	0.5
Water velocity	yes (comparable)	1
Water velocity	dry (stream also dry)	1

Substrate Coverage: Degree to which a crossing structure is covered by substrate. *Substrate Coverage* is directly related to passability for some aquatic species that require substrate or that tend to avoid areas that lack cover. It is also an important element of roughness that can create areas of low-velocity water (boundary layers) utilized by weak-swimming organisms.
Substrate Coverage is also an indirect indicator of potential velocity issues at higher flows.

Openness: Cross-sectional area of the structure opening divided by the structure length (distance between inlet and outlet) measured in feet. *Openness* is calculated for both the inlet and outlet and the lower value is assigned to the structure. If there are multiple structures at a crossing the value for the structure with the highest *Openness* is assigned to the crossing as a whole. Turtles are believed to be affected by the *Openness* of a crossing structure; other species may be affected as well.

Height: Maximum height of the crossing structure. This variable is parameterized so that it only comes into play for very small structures.

Outlet Armoring: Presence/absence of streambed armoring (e.g., riprap, asphalt, concrete) at the outlet and the relative amount of armoring. Armoring is considered "extensive" if the length (upstream to downstream) of the streambed that is armored is greater or equal to half the bankfull width of the natural stream channel. *Outlet Armoring* is an indirect indicator of potential velocity issues at higher flows.

Internal Structures: Presence/absence of structures inside a culvert or bridge (e.g. weirs, baffles, supports). The *Internal Structures* variable is used in the scoring algorithm as it relates to the potential for creating turbulence within a crossing structure. To the extent that *Internal Structures* physically block the movement of aquatic organisms it is covered by the *Physical Barriers* variable.

Step 1: Component Scores

The component scores are not meant to equate to passability. In each case the component score is intended the cover the full range of problems (assessable by our protocol) associated with that variable: from 0 (worst case) to 1 (best case). For *inlet grade*, having an inlet drop or perched inlet is the worst case among the options, thus they score "0." This is not meant to say that all structures with inlet drops are impassible. The effect of *inlet grade* on passability scores is controlled by the weight it is given in computing the composite score (see Step 2 below).

Scoring categorical predictors is simply a matter of assigning a score for each possible category. Table 2 lists all of the categorical predictors and the scores associated with each category.

Scoring continuous predictors requires a function to convert the predictor to a score. There are three continuous predictors and three associated functions. The functional forms used were chosen because they have shapes desired by the expert team or because they fit the series of points specified by the expert team. Appendix A includes the r code defining each of these functions ("x" is the measured value for each variable).

The scoring equation for *Openness* is:

(1) $s_o = a(1 - e^{-kx^{(1-d)}})^{1/(1-d)}$

Where S_o is the score for openness, a=1, k=15, and d = 0.62
when openness is recorded in feet.

The equation for Height is:

(2) $s_h = \min(\frac{ax^2}{b^2 + x^2}, 1)$

Where S_h is the component score for height, a = 1.1, and b=2.2
when height is recorded in feet.

The equation for Outlet Drop is:

(3) $s_{od} = 1 - \frac{ax^2}{b^2 + x^2}$

Where S_{od} is the Outlet Drop component score, a=1.029412, and b=0.51449575
when outlet drop is recorded in feet.

Some notes about the component scores

1. The option "clogged/collapsed/submerged" for *inlet grade* is an option surveyors use to indicate that it was not possible to measure the structure's dimensions. If the inlet is clogged or collapsed enough to affect passability it will be covered under *physical barriers*. This is why it receives a "1" instead of a "0", because problems associated with this option are covered by the *physical barriers* variable.

2. The rationale for giving a component score of "1" to "unknown" for *inlet grade* is similar to that for "clogged/collapsed/submerged." It is hard to know how to interpret "unknown." However, if conditions at the inlet are creating a physical barrier to passage it will be covered under *physical barriers*.

3. We included *inlet grade* as a variable in addition to *physical barriers* because inlet drops create both velocity and physical barrier (jump barrier) issues. The physical barrier issues are covered by the *physical barriers* variable. The *inlet grade* variable captures the velocity issues at the inlet. Perched inlets can create depth issues at low flows (if water can't get into the structure inlet). These may not be apparent at the time of the survey. Thus, the presence of a perched inlet is a concern even if it doesn't represent a physical barrier ("dry") at the time when the survey is conducted.

4. The variable *internal structures* is included to account for turbulence issues. There is likely to be turbulence associated with weirs and baffles when these are included inside crossing structures. If they also create physical barriers they will be covered by the *physical barriers* variable. They are often included in structures to help aquatic organism passage but they sometimes do more harm than good and may be good for some species while creating problems for others. The inclusion of well-designed weirs or baffles is likely to improve the component scores for water depth and water velocity. They get docked a little in our scoring system for introducing turbulence.

5. It is difficult to know how to score the "other" option under *internal structures* because it is difficult to know what, if any, impact these other structures will have on turbulence. If, however, they represent a physical barrier they will be covered under the *physical barriers* variable.

Step 2: Weighted Composite Scores

An expert team of nine people provided input on how the variables should be weighted based on best professional judgement. The weights used with the component scores are listed in table 3. The weights are simply the means of the nine weights for each variable provided by the experts. We display the weights out to three decimal places not to suggest that we know the weights to this level of precision but to reduce overall error in the model by not introducing an additional source of error (rounding error). The composite score is the sum of the products of each component score and its weight.

Table 3. Weights associated with each parameter in the scoring algorithm.

parameter	weight
Outlet drop	0.161
Physical barriers	0.135
Constriction	0.090
Inlet grade	0.088
Water depth	0.082
Water velocity	0.080
Scour pool	0.071
Substrate matches stream	0.070
Substrate coverage	0.057
Openness	0.052
Height	0.045
Outlet armoring	0.037
Internal structures	0.032

Step 3: Final Aquatic Passability Score

The final Aquatic Passability Score is the lower of either the composite score or the *Outlet Drop* component score. The rationale for this is that although many factors can affect aquatic organism passage, when an outlet drop is above a certain size it becomes the predominant factor that determines passability.

Aquatic Passability Score = Min[Composite Score, *Outlet Drop* score]

Mapping Aquatic Passability Scores

For mapping purposes, we assigned narrative descriptors for different ranges of aquatic passability as follows.

Descriptor	Aquatic Passability Score(s)
No barrier	1.0
Insignificant barrier	0.80 – 0.99
Minor barrier	0.60 – 0.79
Moderate barrier	0.40 – 0.59
Significant barrier	0.20 – 0.39
Severe barrier	0.00 – 0.19

People often ask about the relationship between these categories and actual passability for fish and other aquatic organisms. At this point the relationship is unknown and we regard it as a fruitful area for future research. The concept of aquatic passability is complicated and includes: variation in the swimming and leaping abilities of individuals within a species (what proportion of the population can pass), variability in passage requirements for a broad diversity of species that inhabit rivers and streams (what proportion of species can pass), and the timing of passability (for what proportion of the year is the structure passable).

For now, the best way to consider the aquatic passability scores is that they represent the degree to which crossings deviate from an ideal. We assume that those crossings that are very close to the ideal (scores > 0.6) will present only a minor or insignificant barrier to aquatic organisms. Those structures that are farthest from the ideal (scores < 0.4) are likely to be either significant or severe barriers. These are, however, arbitrary distinctions imposed on a continuous scoring system and should be used with that in mind.

APPENDIX A - R code for continuous scoring functions.

```
#-------------------------------------------------------------------------#
# define function for Openness score calculation  #----------
-------------------------------------------------------------------#
calc.openness.score <- function(x){
        # Using von Bertalanffy functional form (Bolker pg 97)
        a = 1
        k = 15
        d=0.62
        return(a * (1-exp(-k*(1-d)*x))^(1/(1-d)))
        # note exp is based on e not 10.
}

#-------------------------------------------------------------------------#
# Define Function for Calculating Height Scores  #----------
-------------------------------------------------------------------#
calc.height.score <- function(x){
        a <- 1.1
        b <- 2.2
        # Use Holling Type II function (Bolker pg 92):
        result <- a*x^2/(b^2 + x^2)
        result[result > 1] <- 1 # Truncate results to 1
        return(result)
}


#-------------------------------------------------------------------------#
# Define Function for Calculating Outlet Drop Scores  #-------
-------------------------------------------------------------------------#
calc.outlet.drop.score <- function(x){
        a <- 1.029412
        b <- 0.51449575
        score <- 1 - a*x^2/(b^2 + x^2)
        score[x > 36] <- 0
        return(score)
}
```

Flood Risk Data Justification

Cornell Water Resources Institute modeled the flood risk data tables within the inventory document. Below are notes justifying some missing information for several crossings as provided by Cornell staff, Allison M. Truhlar, PhD.

Inaccessible crossings were not modeled for flood risk as necessary parameters were not measured such as the outlet or inlet dimensions. Crossings also missing slope information were not measured as that is another necessary field for the flood risk algorithm. Cornell was notified that slope is an optional field on the NAACC database. Moving forward, all NAACC assessment within NYS will require slope measurements to ensure flood risk is modeled.

For crossings missing slope, "a 'dummy slope' was generated to calculate an estimate of the peak flow through the watershed draining into the culvert. This calculation is based solely on the location of the culvert, and therefore would not be biased by the missing dimension information. The peak flow information is useful if an engineer were to later calculate the capacity of the crossing (Truhlar, 2018)."

Peak flow values are modeled for most crossings, however they are only relevant when the culvert capacity is provided for comparison. In cases where the culvert capacity was not modeled due to missing information, future engineers can collect missing information and calculate the culvert capacity. Crossings that do not have culvert capacity modeled were not included in the ranking system.

Peak flows were based on current estimates calculated by Cornell University. Future peak flows are using projected rainfall estimates for 2050.

"The 'peak_logical' field indicates whether something was modeled successfully (TRUE), whether it was not modeled due to failing a condition in the code (failed), or whether the crossing information was not document by NYS DEC staff in initial exchanges with Cornell (NA) (Truhlar, 2018)."

Bridges that do not have a box/bridge with abutments or open bottom arch inlet will not be modeled for flood risk.

For further clarification on Cornell Water Resources Institute flood modeling, please contact:

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Funding Opportunities

Grants Available for Culvert Replacement Projects

Granting Agency	Grant	Project Type
EBTJV (Eastern Brook Trout Joint Venture)	EBTJV FY25 Brook Trout Project Funding RFP https://easternbrooktrout.org/projects/funding	Each year, the Eastern Brook Trout Joint Venture requests project proposals that are focused on conserving and restoring habitat that will support healthy and productive populations of wild Brook Trout. Many activities that improve brook trout populations are eligible.
FEMA (Federal Emergency Management Agency)	Clean Energy Communities (CEC) Program https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Communities	Municipalities that complete four of 10 priority actions will be considered Clean Energy Communities (CEC).
FEMA	Hazard Mitigation Assistance Pre-Hazard Mitigation Assistance BRIC Program https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities	Federal funding can be made available for projects to mitigate future damages and can include culvert right sizing and stream stabilization.
HUD (US Department of Housing and Urban Development)	Community Development Block Grant Program https://www.hud.gov/program_offices/comm_planning/cdbg	Program can potentially fund improvements in public infrastructure.
NYS DEC (Department of Environmental Conservation)	Climate Smart Communities Grant https://dec.ny.gov/environmental-protection/climate-change/resources-for-local-governments/grants-for-climate-action	Funding provided for culvert replacement and nature-based shoreline restoration projects.
NYS DEC	Hudson River Estuary Program, Local Stewardship Planning Grants https://dec.ny.gov/news/environmental-notice-bulletin/2022-04-20/2022-hudson-river-estuary-grants-for-local	Grant funds planning and design work for water infrastructure to improve resiliency for flooding.
NYS DEC	Non-Agricultural Nonpoint Source Planning Grant https://dec.ny.gov/get-involved/grant-applications/non-agricultural-nonpoint-source-planning-ms4-mapping-grant	Planning funds for streambank stabilization and culvert repair or replacement.
NYS DEC	Restoration of Watershed Connectivity https://dec.ny.gov/news/press-releases/2022/3/dec-announces-availability-of-1-million-in-grants-available-to-improve-water-quality-bolster-resiliency-in-new-york-estuaries	Funding for restoration of aquatic connectivity for herring and eels.
NYS DEC	Tidal Hudson River Communities https://dec.ny.gov/news/press-releases/2023/5/dec-announces-215-million-in-funding-is-now-available-for-tidal-hudson-river-communities	Help communities along the Hudson River Estuary improve water quality. It may be used to support development of plans, purchase of equipment, and/or construction of physical improvements.

NYS DEC	Trees for Tribs https://dec.ny.gov/nature/forests-trees/saratoga-tree-nursery/trees-for-tribs	Trees from the Saratoga Tree Nursery to re-establish/restore riparian buffers using native vegetation. First come-first served, tree stock is quickly exhausted.
NYS DEC	Water Quality Improvement Project: Aquatic Connectivity Restoration https://dec.ny.gov/get-involved/grant-applications/wqip-program	Restoration of aquatic connectivity with a maximum grant of $250,000.
NYS DEC	Water Quality Improvement Project: Land Acquisition for Source Water Protection https://dec.ny.gov/get-involved/grant-applications/wqip-program	$4M max award, 25% match
NYS DEC	Water Quality Improvement Project: Municipal Separate Storm Sewer Systems (MS4s) https://dec.ny.gov/get-involved/grant-applications/wqip-program	$500,000-600,000 max award depending on project type, 25% match
NYS DEC	Water Quality Improvement Project: Non-Agricultural Nonpoint Source Abatement and Control https://dec.ny.gov/get-involved/grant-applications/wqip-program	Funding for streambank stabilization and riparian buffers as well as culvert repair and replacement projects. 25% match.
NYS DEC	Water Quality Improvement Project: Wastewater Treat-ment Improvement https://dec.ny.gov/get-involved/grant-applications/wqip-program	$1-10M max award depending on project type Watershed Plan Implementation, $5-10M max award, 25% match
NYS DEC Hudson River Estuary Program in partnership with NEWIPCC	Restoration of Watershed Connectivity https://dec.ny.gov/nature/waterbodies/oceans-estuaries/hudson-river-estuary-program/grants-funding-opportunities	Funding for restoration of aquatic connectivity for herring and eels.
NYS DOS	Brownfield Opportunity Area (BOA) https://dos.ny.gov/system/files/documents/2020/03/dos-boa-fact-sheet_2020.pdf https://dos.ny.gov/brownfield-redevelopment	Takes a neighborhood-wide approach to contaminated lands and provides grants that support communities to compre-hensively assess existing economic and environmental conditions associated with brownfield blight and impacted areas, iden-tify and prioritize community supported redevelopment opportunities, and attract public and private investment.
NYS DOS	Local Waterfront Revitalization Program https://dos.ny.gov/local-waterfront-revitalization-program	Funding to prepare a Local Waterfront Revitalization Plan (LWRP) or implement a component of an approved LWRP.

NYS DOT	BRIDGE program https://www.dot.ny.gov/BRIDGENY	The BRIDGE NY program provides enhanced assistance for local governments to rehabilitate and replace bridges and culverts.
NYS DOT	CHIPs: Consolidated Highway Improvement Program https://www.dot.ny.gov/programs/chips	CHIPS program provides State funds to municipalities to support the construction and repair of highways, bridges, highway-railroad crossings, and other facilities that are not on the State highway system. Note that PAVE NY is closely related to CHIPs and may help finance resurfacing efforts.
NYS EFC (Environmental Facility Corporation)	Clean Water State Revolving Fund https://www.epa.gov/cwsrf	CWSRF can provide various forms of project finance for certain habitat restoration and protection projects in national estuary program areas. Short and long-term loans are available at no interest and low interest rates.
NYS EFC	Green Innovation Grant Program (GIGP) https://efc.ny.gov/gigp	Competitive grants are awarded annually to projects that improve water quality and mitigate the effects of climate change through the implementation of one or more of the following green practices: Green Stormwater Infrastructure, Energy Efficiency, Water Efficiency and Environmental Innovation.
NYS EFC	Wastewater Infrastructure Engineering Planning Grant (WIEP) https://efc.ny.gov/EPG	For engineering and consulting services to produce engineering reports to construct or improve municipal wastewater systems.
NYS Hudson River Valley Greenway	Greenways Communities Grant Program https://hudsongreenway.ny.gov/grants-funding	Small projects that can fund natural resource protection initiatives.
NYS OPRHP (Office of Parks, Recreation & Historic Preservation)	Community Development Block Grant Program https://hcr.ny.gov/community-development-block-grant	Development projects in small communities and counties: Resilient drinking water, clean water and stormwater infrastructure projects; Construction and renovation projects; Risk assessment and engineering projects
TU (Trout Unlimited)	Embrace a Stream (EAS) https://www.tu.org/get-involved/volunteer-tacklebox/fundraising-resources/grants-corporate-fundraising/embrace-a-stream/	A matching grant program administered by TU that awards funds to TU chapters and councils for coldwater fisheries conservation. Awards go to help restore stream habitat, improving fish passage, and protecting water quality in states from coast to coast.

Interpretive Guide

Road: Camp Creek **Stream:** Unknown

Location
Coordinates: 42.15002, -73.87178
Location Description: 127 camp creek
Date Observed: 10/27/2017
Survey ID: 55692

Road
Road Type/Surface: Paved
Road Fill Height (feet): 0.50
Road Ownership: Town

Results
Barrier Evaluation: Insignificant barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 22.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: Comparable
Substrate Type: Silt
Substrate Coverage: 100%

Upstream

Downstream

Crossing Comments: Outlets to pond

ROAD: The road that the crossing is on.

STREAM: The waterway that passes through the crossing.

LOCATION

Coordinates: GPS coordinates taken in the field.

Location Description: A brief description of landmarks or other identifying features to help locate the crossing.

Date Observed: The date the crossing was assessed for habitat continuity (format: YYYY-MM-DD).

Survey ID: A unique database assigned ID of a crossing survey.

RESULTS

Barrier Evaluation: A description of how severe of a barrier the crossing is to fish and wildlife passage.

Aquatic Organism Passage Score: A classification of the crossings passability into a few, coarse catagories: "no score - missing data", "No AOP" (no passage) , "Reduced AOP" (reduced passage), "Full AOP" (full passage) directly from the survey data.

Condition/Maintenance: Information about scheduled maintenance or replacement, *to be determined at Prioritization Meeting*

Max Return Interval: The maximum return period in which the culvert is expected to pass (i.e. not exceed its capacity) under current climate conditions and future conditions modeled for through the next 200 years

ROAD

Road Type/Surface: A description of the type of road and the number of lanes, where applicable.

Road Fill Height: The height (in feet) from the top of the culvert inlet to the surface of the road.

Road Ownership: The entity (town, state, private homeowner, etc.) in charge of road maintenance

CROSSING CHARACTERISTICS:

Crossing Type: This refers to the type of crossing it is, i.e. culvert, bridge, etc.

Length: Length of the structure at its top (feet)

Number of structures/cells: The number of individual culverts or bridge cells that make up the crossing. Structures are numbered by looking at the inlet and counting from left to right.

Alignment: The crossing can be flow-aligned or skewed. A crossing is “Skewed” if the stream enters it a 45° angle or more. Angle of skew is included when available.

Dry Passage/Height: If there is dry passage through the structure, this is the average height (feet) above the bottom of the structure or dry stream bed to the top of the structure.

Crossing Comments: Any additional comments pertaining to the crossing or its surroundings.

STREAM CHARACTERISTICS

Scour Pool: The size of the pool (if there is one) at the crossing outlet. A scour pool is considered “Large” if it is twice the width and/or the depth of an average-sized pool in the stream.

Water Depth/Velocity Matches Stream: A comparison of the water depth in the stream away from the influence of the crossing to the water depth in the structure.

Substrate Matches Stream: Assessment of how well the substrate within the structure matches the natural, undisturbed channel substrate.

Substrate Type: A classification based on particle size of the substrate in the crossing.

Substrate Coverage: Extent of substrate inside the crossing that exists in continuous layer across the entire bottom of the structure from side to side

PHOTOS: Photos taken of the stream above and below the crossing.

Return Interval Chart: Expresses the results of flood risk modeling performed by Cornell WRI

-**Return Interval:** A return interval of 2 years means that the river has a 1 in 2 (or 50%) chance of reaching a certain peak flow in that time frame. Likewise, a return interval of 5 years means the river has a 1 in 5 (or 20%) chance of reaching the peak flow, and so on.

-**Peak Flow**: The highest velocity at which the water is predicted to move through the crossing at a given return interval. It is expressed in cubic feet per second (cfs).

-**Culvert Capacity:** The highest velocity a culvert can withstand.

-**Pass/Fail:** If the Peak Flow exceeds the Culvert Capacity, then the culvert will say "Fail" for that return interval.

STRUCTURE INFORMATION

Material: The type of material the structure is made out of, e.g. concrete, plastic, stone, etc.

Physical Barriers/Severity: A description of any physical barriers such as debris, grates, etc. and its severity with regards to blocking fish movement (see NAACC protocol for more details).

Internal Features/Structures: Internal structures like baffles and weirs are listed here.

Slope Matches Stream (%): A visual assessment of whether or not the slope of the crossing is comparable to that of the stream. If the slope of the structure was measured, it is expressed as a percentage.

Structure Comments: Any additional comments about the structure in question.

Outlet Armoring: Presence and extent of material placed below the outlet for the purpose of diffusing flow and minimizing scour.

INLET

Inlet Photo: A photo taken looking at the inlet of the crossing.

Inlet Shape/Type: The shape of the inlet (e.g. round, box) and the style of the inlet that influences how water enters the inlet (e.g. headwall, wingwalls).

Inlet Drop/Grade: Where the inlet is located in relation to the stream bottom (e.g. at stream grade, perched, etc.). For UMASS assessments, this information was only collected if the inlet was perched, in which case the height of the perch is also recorded.

Dimensions: The dimensions of the culvert are given in feet. For details on how these fields were collected for different crossing types, see the NAACC and/or UMASS protocols.

Inlet Substrate Water Width: The width (in feet) of the substrate or the water surface (whichever is wider) at the structure inlet.

Inlet Water Depth: Water depth at inlet in feet.

OUTLET

Outlet Photo: A photo taken looking at the outlet of the crossing.

Outlet Shape: The shape of the outlet.

Outlet Drop/Grade: Whether or not an outlet drop is present (UMASS) or the grade in relation to the stream bottom (NAACC).

Drop to Stream Surface/Bottom: The distance (in feet) from the bottom of the structure to the surface of the water, and from the bottom of the structure to the stream bottom. This is particularly applicable to crossings that have an outlet drop.

Dimensions: The dimensions of the culvert are given in feet. For details on how these fields were collected for different crossing types, see the NAACC and/or UMASS protocols.

Outlet Substrate Water Width: The width (in feet) of the substrate or the water surface (whichever is wider) at the structure outlet.

Outlet Water Depth: Water depth at outlet in feet.

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	3.1	0.6	FAIL
5	5.1	0.6	FAIL
25	9.1	0.6	FAIL
50	11.1	0.6	FAIL
100	13.2	0.6	FAIL
200	15.8	0.6	FAIL

STRUCTURE 1 OF 1

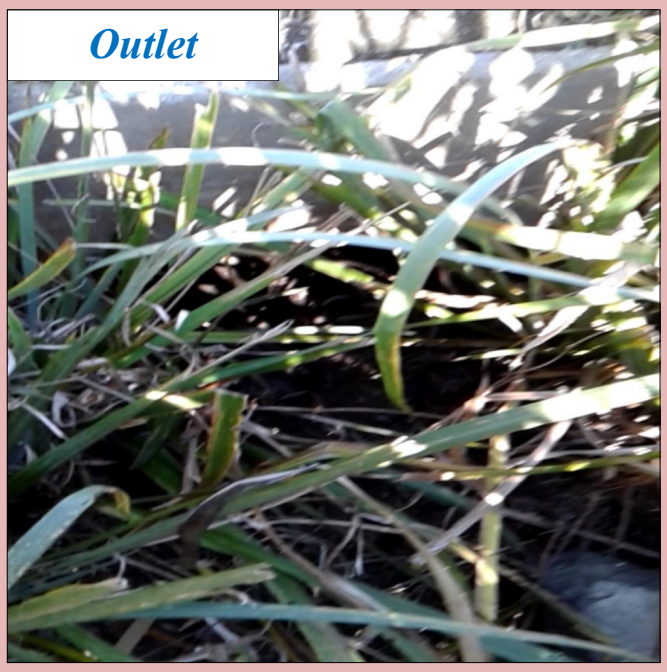
Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None
Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: None

Inlet

INLET

Inlet Shape/Type: Box Culvert, Headwall
Inlet Drop/Grade: At Stream Grade
Width: 2.3, Height: 2.0
Substrate/Water Width: 2.30
Water Depth: 0.00

Outlet



OUTLET

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 2.0, Height: 1.5
Substrate/Water Width: 1.50
Water Depth: 0.00

For additional data, see Appendix p. A-11

Priority Crossings

Top 5 Crossings for Flood Risk

Town Roads

This chart is a summary of road-stream crossings with the using an index that takes into consideration the shortest flood intervals (i.e. most likely to flood the road in smaller storms) and the culvert capacity (i.e. largest potential of flood water to be released) based on modeling performed by Cornell University. “Capacity Difference” refers to the difference (cfs) between the culverts current modeled capacity and the modeled peak flow of a 2-year storm event. Note that this list only includes crossings on town- managed roads.

Photo	Capacity Difference (cfs)	Page #	Road	Survey ID
A	8.7	227	Railroad	55651
B	7.0	221	Railroad	55475
C	5.1	95	Hunterstown Road	55653
D	2.5	59	Camp Creek	55692
E	2.5	69	Dales Bridge	20236

Top 5 Crossings as Barriers to Aquatic Organisms

Town Roads

This chart is a summary of road-stream crossings with the lowest aquatic organism passability (AOP) score (i.e. most likely to be a barrier to organisms looking to travel upstream) based on in-field assessments done according to the NAACC protocol. Note that this list only includes crossings on town-managed roads.

Photo	AOP Score	Page #	Road	Survey ID
A	0.93	85	Eastern Parkway	20618
B	0.91	59	Camp Creek	55692
C	0.90	103	Lasher Road	26334
D	0.89	177	Route 8	22191
E	0.85	207	9G	55776

Top 5 Crossing Priorities for Town of Germantown

This chart is a summary of road-stream crossings that the Town of Clinton has prioritized independent of aquatic barrier and flood risk assessment.

Note that this list only includes crossings on town-managed roads.

Photo	AOP Score	Page #	Road	Survey ID
A	0.11	109	Lasher Road	29374
B	0.08	91	Hunterstown Road	55728
C	0.27	95	Hunterstown Road	55653
D	n/a	n/a	South Road	26387
E	0.64	117	Old Saw Mill Road	29362

Road: Lasher Road **Stream: unknown**

Location
Coordinates: 42.10197, -73.85291
Location Description: Near intersection with South Road
Date Observed: 6/29/2015
Survey ID: 29374

Road
Road Type/Surface: Paved
Road Fill Height (feet): 1.25
Road Ownership: Town

Results
Barrier Evaluation: Severe barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 51.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: no comments

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	2.1	1.0	FAIL
5	3.8	1.0	FAIL
25	7.6	1.0	FAIL
50	9.2	1.0	FAIL
100	11.1	1.0	FAIL
200	13.5	1.0	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 1.7
Structure Comments: No data
Outlet Armoring: None

Inlet

Inlet Shape/Type: Round Culvert, Wingwalls
Inlet Drop/Grade: At Stream Grade
Width: 2.5, Height: 2.8
Substrate/Water Width: 0.80
Water Depth: 0.50

Outlet

Outlet Shape:
Outlet Drop/Grade: Cascade
Drop to Stream Surface/Bottom: 1.30/2.80
Width: 2.5, Height: 2.5
Substrate/Water Width: 0.90
Water Depth: 0.10

Road: Hunterstown **Stream: Unknown**

Location
Coordinates: 42.12083, -73.90211
Location Description: Hunterstown north
Date Observed: 10/31/2017
Survey ID: 55728

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.50
Road Ownership: Town

Results
Barrier Evaluation: Severe barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 2

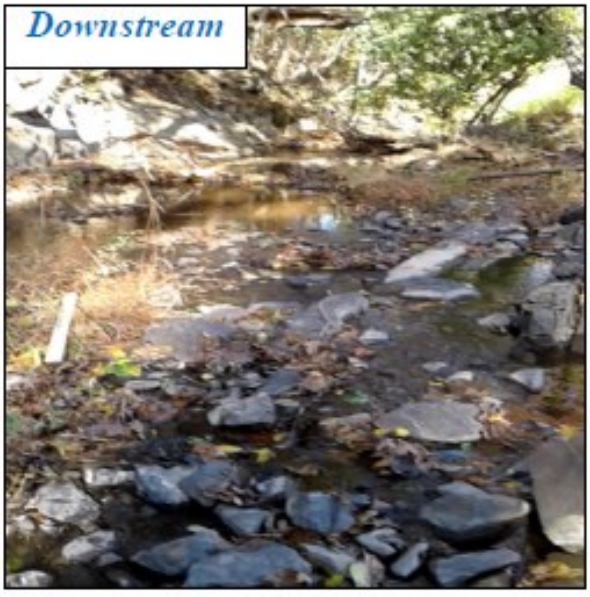
Stream and Crossing

Crossing Characteristics
Crossing Type: Multiple Culvert
Length: 60.00
Number of structures/cells: 2
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream



Crossing Comments: Only one culvert with water

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	6.7	5.2	FAIL
5	16.0	5.2	FAIL
25	39.5	5.2	FAIL
50	50.5	5.2	FAIL
100	63.0	5.2	FAIL
200	78.9	5.2	FAIL

Structure 1 of 2

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None
Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Projecting
Inlet Drop/Grade: Perched
Width: 3.0, Height: 3.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Outlet

Outlet Shape: Round Culvert
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 4.00/5.20
Width: 3.0, Height: 3.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Structure 2 of 2

Material: Plastic
Physical Barrier(s)/Severity: None/None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Dimensions:
- Width: 5.00, Height: 5.00
- Substrate/Water Width: 2.50
- Water Depth: 0.40

Outlet

Outlet Shape: Round Culvert
Outlet Drop/Grade: Free Fall Onto Cascade
Drop to Stream Surface/Bottom: 1.50, 2.40
Dimensions:
- Width: 5.00, Height: 5.00
- Substrate/Water Width: 2.10
- Water Depth: 0.30

For additional data, see Appendix

Additional Photos

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Road: Huntertown **Stream: Unknown**

Location
Coordinates: 42.11931, -73.90213
Location Description: Hunterstown
Date Observed: 10/23/2017
Survey ID: 55653

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.50
Road Ownership: Town

Results
Barrier Evaluation: Significant barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: Poor
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Multiple Culvert
Length: 40.00
Number of structures/cells: 2
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: No-Shallower/Unknown
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: 2 culverts

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	6.8	1.7	FAIL
5	16.1	1.7	FAIL
25	39.7	1.7	FAIL
50	50.8	1.7	FAIL
100	63.3	1.7	FAIL
200	79.3	1.7	FAIL

Structure 1 of 2

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: Culvert not level
Outlet Armoring: Not Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 4.0, Height: 4.0
Substrate/Water Width: 2.60
Water Depth: 0.70

Outlet

Outlet Shape: Round Culvert
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 1.00/1.60
Width: 4.0, Height: 4.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Structure 2 of 2

Material: Metal
Physical Barrier(s)/Severity: Deformation/Moderate
Internal Features/Structures: None

Slope Matches Stream (%): -1.00
Structure Comments: Culvert bottom rotted out

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Dimensions:
- Width: 3.00, Height: 3.00
- Substrate/Water Width: 1.20
- Water Depth: 0.20

Outlet

Outlet Shape: Round Culvert
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.80, 1.00
Dimensions:
- Width: 3.00, Height: 3.00
- Substrate/Water Width: 0.00
- Water Depth: 0.00

For additional data, see Appendix

Additional Photos

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For additional data, see Appendix

Location
Coordinates: 42.1059, -73.85190
Location Description:
Date Observed: 07/07/2015
Survey ID: 26387

Road
Road Type/Surface: Paved
Road Fill Height (feet): 4.8
Road Ownership: Town

Results
Barrier Evaluation:
Aquatic Organism Passage Score:
Condition/Maintenance:
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Inaccessible
Length:
Number of structures/cells: 1
Alignment: Skewed (>45%)
Dry Passage/Height:

Stream Characteristics
Scour Pool:
Water Depth/Velocity Matches Stream:
Substrate Matches Stream:
Substrate Type:
Substrate Coverage:

Upstream

Downstream

Crossing Comments: Large wetland up/down stream. Water ~4 feet deep. In/out submerged. UNABLE TO MEASURE

Structure 1 of 1

Material:
Physical Barrier (s)/Severity:
Internal Features/Structures:

Slope Matches Stream (%):
Structure Comments:
Outlet Armoring:

Inlet

Outlet

Inlet

Inlet Shape/Type:
Inlet Drop/Grade:
Width: Height:
Substrate/Water Width:
Water Depth:

Outlet

Outlet Shape:
Outlet Drop/Grade:
Drop to Stream Surface/Bottom:
Width: , Height:
Substrate/Water Width:
Water Depth:

Crossing Inventory

Town-owned Structures

Road: Best Lane **Stream:** unknown

Location
Coordinates: 42.11728, -73.86764
Location Description: Best Lake Road
Date Observed: 6/29/2015
Survey ID: 29348

Road
Road Type/Surface: Paved
Road Fill Height (feet): 4.00
Road Ownership: Town

Results
Barrier Evaluation: Insignificant barrier
Aquatic Organism Passage Score: Full AOP
Condition/Maintenance: OK
Max Return Interval: 2

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 43.50
Number of structures/cells: 2
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: Comparable
Substrate Type: Gravel
Substrate Coverage: 100%

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.2	0.8	FAIL
5	4.3	0.8	FAIL
25	18.8	0.8	FAIL
50	26.9	0.8	FAIL
100	36.7	0.8	FAIL
200	49.5	0.8	FAIL

Structure 1 of 2

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 0.4
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Open Bottom Arch Bridge/Culvert, Projecting
Inlet Drop/Grade: At Stream Grade
Width: 4.0, Height: 2.8
Substrate/Water Width: 4.00
Water Depth: 2.45

Outlet

Outlet Shape: Open Bottom Arch Bridge/ Culvert
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 4.0, Height: 3.0
Substrate/Water Width: 4.00
Water Depth: 2.50

Structure 2 of 2

Material: Plastic
Physical Barrier(s)/Severity: None/None
Internal Features/Structures: None

Slope Matches Stream (%): 0.50
Structure Comments: standing in water at the inlet but dry at outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Dimensions:
Width: 2.00, Height: 2.00
Substrate/Water Width: 1.10
Water Depth: 0.10

Outlet

Outlet Shape: Round Culvert
Outlet Drop/Grade: Free Fall Onto Cascade
Drop to Stream Surface/Bottom: 0.40, 0.90
Dimensions:
Width: 2.20, Height: 2.10
Substrate/Water Width: 0.00
Water Depth: 0.00

For additional data, see Appendix

Additional Photos

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Location
Coordinates: 42.15002, -73.87178
Location Description: 127 camp creek
Date Observed: 10/27/2017
Survey ID: 55692

Road
Road Type/Surface: Paved
Road Fill Height (feet): 0.50
Road Ownership: Town

Results
Barrier Evaluation: Insignificant barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 22.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: Comparable
Substrate Type: Silt
Substrate Coverage: 100%

Upstream

Downstream

Crossing Comments: Outlets to pond

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	3.1	0.6	FAIL
5	5.1	0.6	FAIL
25	9.1	0.6	FAIL
50	11.1	0.6	FAIL
100	13.2	0.6	FAIL
200	15.8	0.6	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Box Culvert, Headwall
Inlet Drop/Grade: At Stream Grade
Width: 2.3, Height: 2.0
Substrate/Water Width: 2.30
Water Depth: 0.00

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 2.0, Height: 1.5
Substrate/Water Width: 1.50
Water Depth: 0.00

Additional Photos

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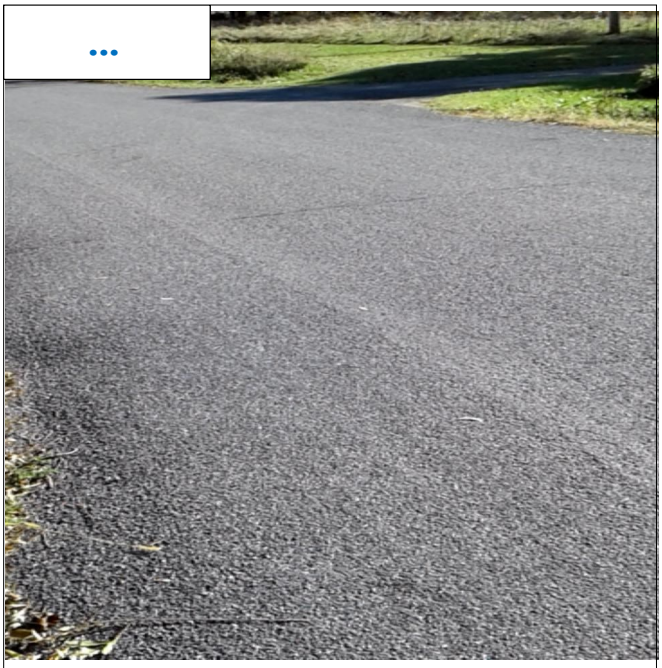

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For additional data, see Appendix

For additional data, see Appendix

Location
Coordinates: 42.15107, -73.86890
Location Description: Camp creek rd
Date Observed: 10/27/2017
Survey ID: 55696

Road
Road Type/Surface: Paved
Road Fill Height (feet): 1.00
Road Ownership: Town

Results
Barrier Evaluation: Insignificant barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 34.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: Comparable
Substrate Type: Silt
Substrate Coverage: 50%

Crossing Comments: Heavy vegetation

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.2	0.3	FAIL
5	1.9	0.3	FAIL
25	3.3	0.3	FAIL
50	4.0	0.3	FAIL
100	4.8	0.3	FAIL
200	5.7	0.3	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: Culvert outlets pond
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 1.5, Height: 1.5
Substrate/Water Width: 0.20
Water Depth: 0.00

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 1.5, Height: 1.5
Substrate/Water Width: 0.30
Water Depth: 0.00

Additional Photos

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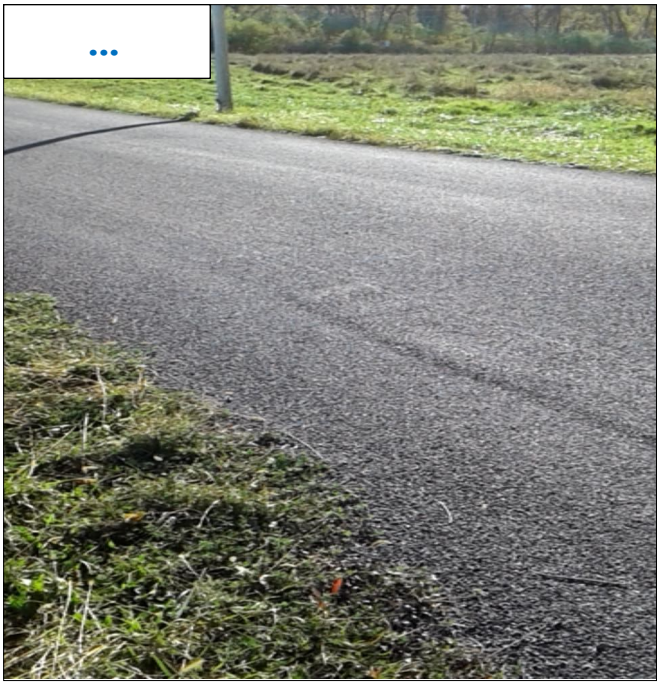

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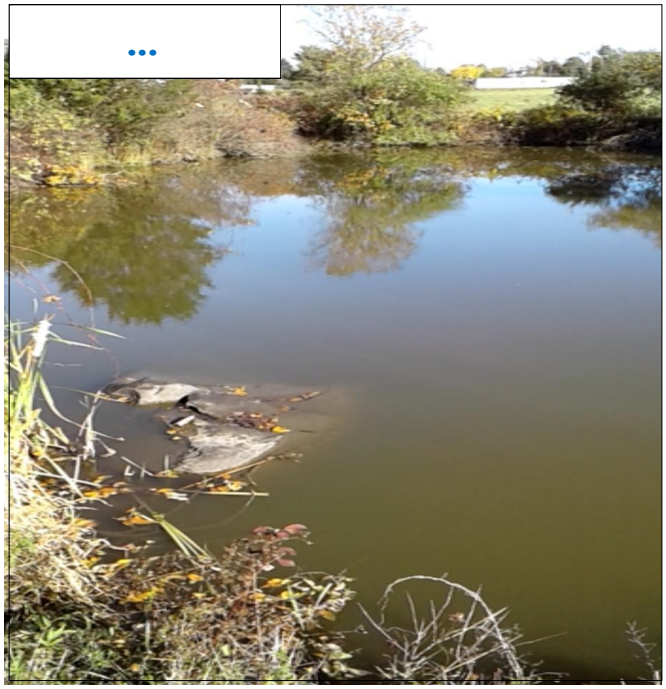


For additional data, see Appendix

For additional data, see Appendix

Location
Coordinates: 42.14994, -73.85094
Location Description: 219 Dale's Bridge Road
Date Observed: 6/27/2015
Survey ID: 20233

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.00
Road Ownership: Town

Results
Barrier Evaluation: Severe barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: No data

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 40.00
Number of structures/cells: 1
Alignment: Skewed (>45°)
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: none

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	No data	No data	No data
5	No data	No data	No data
25	No data	No data	No data
50	No data	No data	No data
100	No data	No data	No data
200	No data	No data	No data

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 1.5
Structure Comments: none
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Projecting
Inlet Drop/Grade: At Stream Grade
Width: 2.0, Height: 1.9
Substrate/Water Width: 0.80
Water Depth: 0.10

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 1.40/2.20
Width: 2.0, Height: 2.0
Substrate/Water Width: 0.40
Water Depth: 0.10

Location
Coordinates: 42.14830, -73.85719
Location Description: connecting 2 ponds
Date Observed: 6/27/2015
Survey ID: 20236

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.00
Road Ownership: Town

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 132.90
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: Culvert is open to storm drain half way down its length. Dammed pond with tail water starts 8 feet upstream.

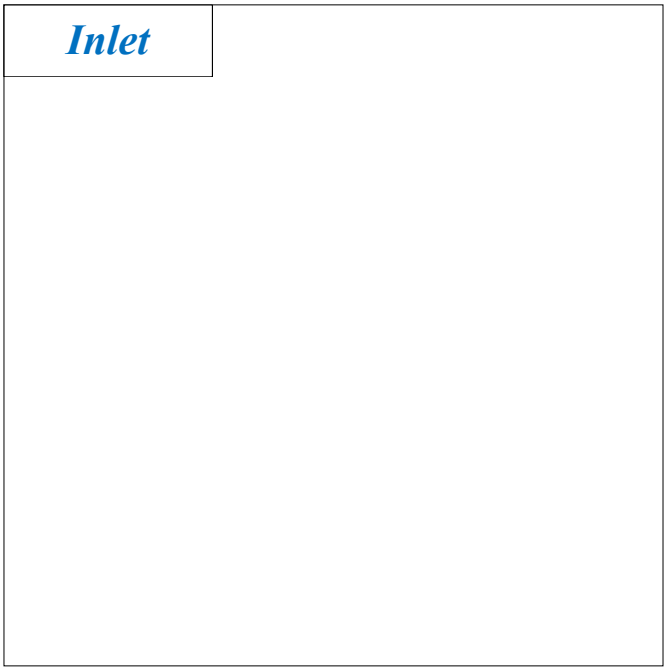
Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	2.8	0.4	FAIL
5	4.9	0.4	FAIL
25	9.1	0.4	FAIL
50	11.0	0.4	FAIL
100	13.2	0.4	FAIL
200	16.0	0.4	FAIL

Structure 1 of 1

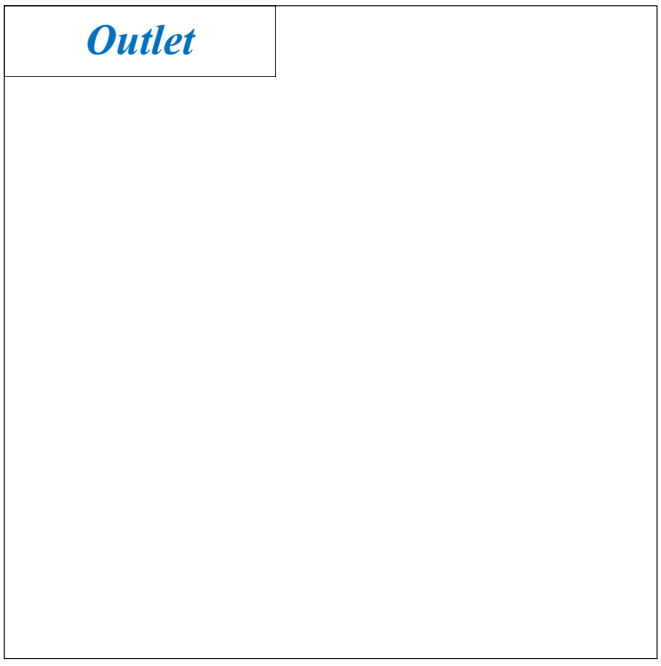
Material: Plastic
Physical Barrier (s)/Severity: Other, Moderate

Slope Matches Stream (%): 1.3
Structure Comments: storm water catch basin half way along culvert

Inlet



Outlet



Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 1.5, Height: 1.1
Substrate/Water Width: 1.30
Water Depth: 0.30

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 1.5, Height: 1.2
Substrate/Water Width: 1.30
Water Depth: 0.30

Additional Photos

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For additional data, see Appendix

For additional data, see Appendix

Location
Coordinates: 42.14606, -73.86086
Location Description: none
Date Observed: 6/27/2015
Survey ID: 20237

Road
Road Type/Surface: Paved
Road Fill Height (feet): 4.00
Road Ownership: Town

Results
Barrier Evaluation: Moderate barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 2

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 41.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: none

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.2	1.7	PASS
5	4.2	1.7	FAIL
25	13.4	1.7	FAIL
50	18.0	1.7	FAIL
100	23.3	1.7	FAIL
200	30.1	1.7	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 5.1
Structure Comments: Pipe seems slightly bent in the middle.

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Projecting
Inlet Drop/Grade: At Stream Grade
Width: 2.8, Height: 2.6
Substrate/Water Width: 2.30
Water Depth: 0.70

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.40/0.80
Width: 3.0, Height: 2.9
Substrate/Water Width: 1.20
Water Depth: 0.10

Location
Coordinates: 42.15015, -73.85083
Location Description: Telephone pole 21
Date Observed: 10/27/2017
Survey ID: 55693

Road
Road Type/Surface: Paved
Road Fill Height (feet): 0.50
Road Ownership: Town

Results
Barrier Evaluation: Severe barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 40.00
Number of structures/cells: 1
Alignment: Skewed (>45°)
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	2.1	0.5	FAIL
5	3.5	0.5	FAIL
25	6.4	0.5	FAIL
50	7.8	0.5	FAIL
100	9.3	0.5	FAIL
200	11.2	0.5	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 2.0, Height: 2.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 2.00/2.00
Width: 2.0, Height: 2.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Additional Photos

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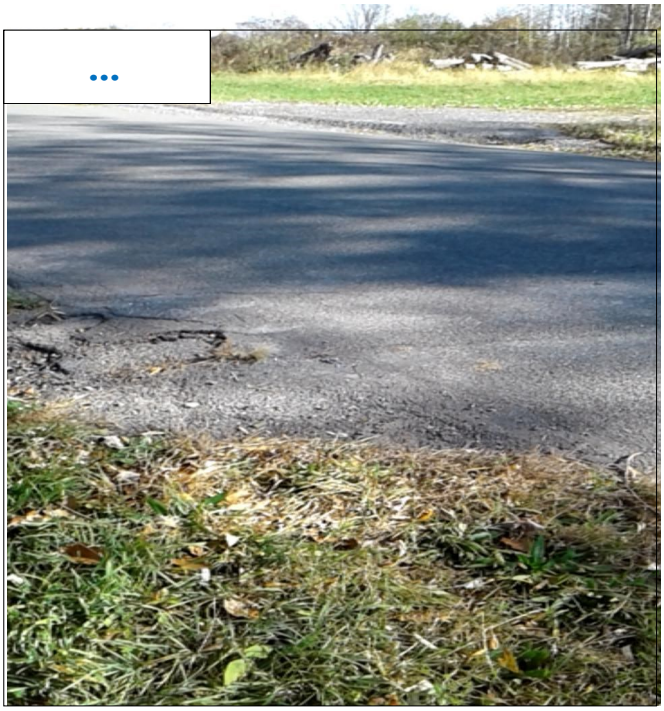

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For additional data, see Appendix

For additional data, see Appendix

Road: Eastern Pkwy **Stream:** unknown

Location
Coordinates: 42.14081, -73.85129
Location Description: none
Date Observed: 6/27/2015
Survey ID: 20607

Road
Road Type/Surface: Paved
Road Fill Height (feet): 3.70
Road Ownership: Town

Results
Barrier Evaluation: Moderate barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: Poor
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 51.80
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: No-Deeper/Yes
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: none

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.0	0.7	FAIL
5	1.7	0.7	FAIL
25	3.2	0.7	FAIL
50	3.9	0.7	FAIL
100	4.7	0.7	FAIL
200	5.6	0.7	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 2.7
Structure Comments: 2 different culvert materials- metal outlet cannot be seen

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Head-wall
Inlet Drop/Grade: At Stream Grade
Width: 1.6, Height: 1.5
Substrate/Water Width: 0.70
Water Depth: 0.10

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 1.8, Height: 1.2
Substrate/Water Width: 1.80
Water Depth: 0.80

Road: Eastern Pkwy **Stream:** unknown

Location
Coordinates: 42.13787, -73.85048
Location Description: 150 East Parkway
Date Observed: 6/27/2015
Survey ID: 20614

Road
Road Type/Surface: Paved
Road Fill Height (feet): 1.80
Road Ownership: Town

Results
Barrier Evaluation: Moderate barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 30.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: none

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.1	0.7	FAIL
5	2.5	0.7	FAIL
25	5.6	0.7	FAIL
50	7.1	0.7	FAIL
100	8.7	0.7	FAIL
200	10.7	0.7	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 2.5
Structure Comments: NA
Outlet Armoring: Not Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Head-wall
Inlet Drop/Grade: At Stream Grade
Width: 2.0, Height: 1.8
Substrate/Water Width: 1.10
Water Depth: 0.20

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.20/0.50
Width: 2.0, Height: 2.0
Substrate/Water Width: 0.60
Water Depth: 0.10

Additional Photos

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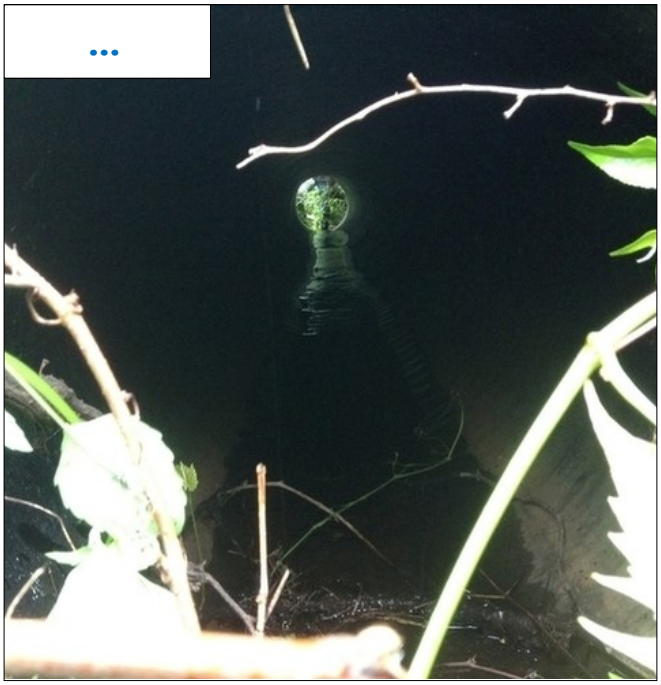

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For additional data, see Appendix

For additional data, see Appendix

Road: Eastern Pkwy **Stream:** unknown

Location
Coordinates: 42.13452, -73.85080
Location Description: none
Date Observed: 6/27/2015
Survey ID: 20618

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.00
Road Ownership: Town

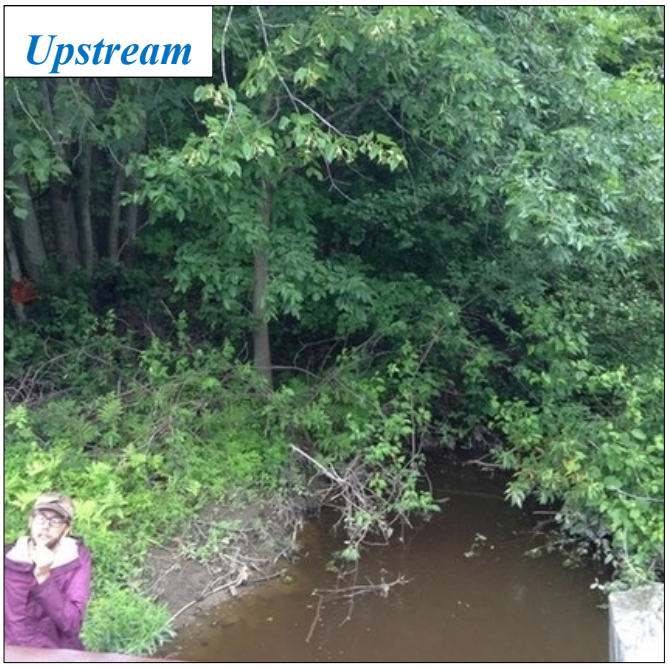
Results
Barrier Evaluation: Insignificant barrier
Aquatic Organism Passage Score: Full AOP
Condition/Maintenance: OK
Max Return Interval: No data

Stream and Crossing

Crossing Characteristics
Crossing Type: Bridge
Length: 26.80
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Yes/No-Slower
Substrate Matches Stream: Comparable
Substrate Type: Silt
Substrate Coverage: 100%

Upstream



Downstream

Crossing Comments: none

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	No data	No data	No data
5	No data	No data	No data
25	No data	No data	No data
50	No data	No data	No data
100	No data	No data	No data
200	No data	No data	No data

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 0.7
Structure Comments: none
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Box/Bridge with Abutments, Headwall
Inlet Drop/Grade: At Stream Grade
Width: 15.6, Height: 3.6
Substrate/Water Width: 15.60
Water Depth: 1.50

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 16.0, Height: 3.8
Substrate/Water Width: 16.00
Water Depth: 1.60

Road: Ford Stream: unknown

Location
Coordinates: 42.13305, -73.85008
Location Description: located a couple hundred feet from Eastern Parkway
Date Observed: 6/29/2015
Survey ID: 29347

Road
Road Type/Surface: Paved
Road Fill Height (feet): 1.40
Road Ownership: Town

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 25.00
Number of structures/cells: 1
Alignment: Skewed (>45°)
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	2.2	0.6	FAIL
5	3.9	0.6	FAIL
25	7.8	0.6	FAIL
50	9.4	0.6	FAIL
100	11.3	0.6	FAIL
200	13.8	0.6	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 0.9
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 1.8, Height: 1.4
Substrate/Water Width: 1.20
Water Depth: 0.30

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 1.8, Height: 1.6
Substrate/Water Width: 1.80
Water Depth: 0.90

Location
Coordinates: 42.14903, -73.85034
Location Description: none
Date Observed: 6/27/2015
Survey ID: 20234

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.00
Road Ownership: Town

Results
Barrier Evaluation: Moderate barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 40.20
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: Yes/No-Faster
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: none

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	0.9	0.7	FAIL
5	1.9	0.7	FAIL
25	4.4	0.7	FAIL
50	5.5	0.7	FAIL
100	6.8	0.7	FAIL
200	8.4	0.7	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 1.6
Structure Comments: none
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Projecting
Inlet Drop/Grade: At Stream Grade
Width: 2.0, Height: 1.9
Substrate/Water Width: 0.90
Water Depth: 0.10

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.40/0.70
Width: 2.0, Height: 1.5
Substrate/Water Width: 0.50
Water Depth: 0.10

Road: Hunterstown **Stream:** Unknown

Location
Coordinates: 42.12083, -73.90211
Location Description: Hunterstown north
Date Observed: 10/31/2017
Survey ID: 55728

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.50
Road Ownership: Town

Results
Barrier Evaluation: Severe barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 2

Stream and Crossing

Crossing Characteristics
Crossing Type: Multiple Culvert
Length: 60.00
Number of structures/cells: 2
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: Only one culvert with water

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	6.7	5.2	FAIL
5	16.0	5.2	FAIL
25	39.5	5.2	FAIL
50	50.5	5.2	FAIL
100	63.0	5.2	FAIL
200	78.9	5.2	FAIL

Structure 1 of 2

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Projecting
Inlet Drop/Grade: Perched
Width: 3.0, Height: 3.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Outlet

Outlet Shape: Round Culvert
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 4.00/5.20
Width: 3.0, Height: 3.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Structure 2 of 2

Material: Plastic
Physical Barrier(s)/Severity: None/None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Dimensions:
Width: 5.00, Height: 5.00
Substrate/Water Width: 2.50
Water Depth: 0.40

Outlet

Outlet Shape: Round Culvert
Outlet Drop/Grade: Free Fall Onto Cascade
Drop to Stream Surface/Bottom: 1.50, 2.40
Dimensions:
Width: 5.00, Height: 5.00
Substrate/Water Width: 2.10
Water Depth: 0.30

For additional data, see Appendix

Additional Photos

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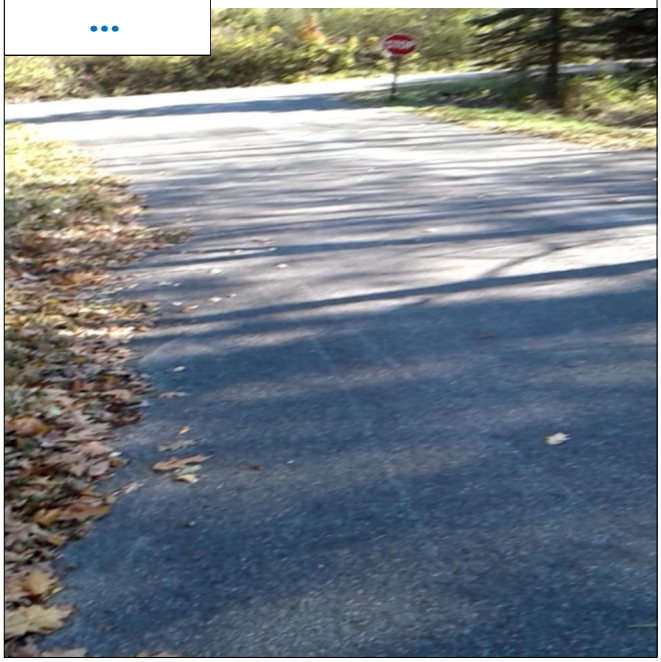

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For additional data, see Appendix

Location
Coordinates: 42.11931, -73.90213
Location Description: Hunterstown
Date Observed: 10/23/2017
Survey ID: 55653

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.50
Road Ownership: Town

Results
Barrier Evaluation: Significant barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: Poor
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Multiple Culvert
Length: 40.00
Number of structures/cells: 2
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: No-Shallower/Unknown
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: 2 culverts

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	6.8	1.7	FAIL
5	16.1	1.7	FAIL
25	39.7	1.7	FAIL
50	50.8	1.7	FAIL
100	63.3	1.7	FAIL
200	79.3	1.7	FAIL

Structure 1 of 2

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None
Slope Matches Stream (%): No data
Structure Comments: Culvert not level
Outlet Armoring: Not Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 4.0, Height: 4.0
Substrate/Water Width: 2.60
Water Depth: 0.70

Outlet

Outlet Shape: Round Culvert
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 1.00/1.60
Width: 4.0, Height: 4.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Structure 2 of 2

Material: Metal
Physical Barrier(s)/Severity: Deformation/Moderate
Internal Features/Structures: None

Slope Matches Stream (%): -1.00
Structure Comments: Culvert bottom rotted out

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Dimensions:
Width: 3.00, Height: 3.00
Substrate/Water Width: 1.20
Water Depth: 0.20

Outlet

Outlet Shape: Round Culvert
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.80, 1.00
Dimensions:
Width: 3.00, Height: 3.00
Substrate/Water Width: 0.00
Water Depth: 0.00

For additional data, see Appendix

Additional Photos

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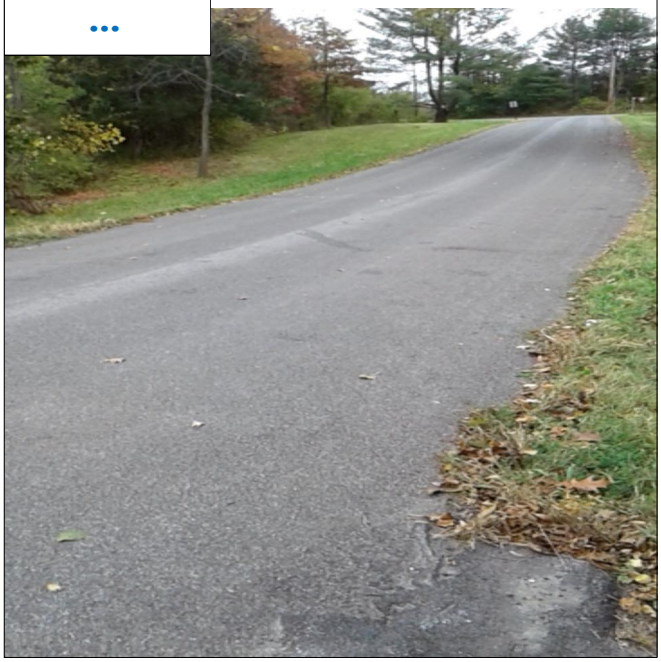

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For additional data, see Appendix

Location
Coordinates: 42.09911, -73.87125
Location Description: West of #37
Date Observed: 7/7/2015
Survey ID: 26328

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.25
Road Ownership: Town

Results
Barrier Evaluation: Moderate barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 5

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 40.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: none

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	0.1	0.2	PASS
5	0.2	0.2	PASS
25	0.5	0.2	FAIL
50	0.7	0.2	FAIL
100	0.9	0.2	FAIL
200	1.1	0.2	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 1.2
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Head-wall
Inlet Drop/Grade: At Stream Grade
Width: 1.1, Height: 1.1
Substrate/Water Width: 0.00
Water Depth: 0.00

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.00/0.50
Width: 1.1, Height: 1.1
Substrate/Water Width: 0.00
Water Depth: 0.00

Location
Coordinates: 42.10131, -73.86656
Location Description: none
Date Observed: 7/7/2015
Survey ID: 26329

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.00
Road Ownership: Town

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: Poor
Max Return Interval: No data

Stream and Crossing

Crossing Characteristics
Crossing Type: Bridge
Length: 29.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Shallower/Yes
Substrate Matches Stream: Contrasting
Substrate Type: Cobble
Substrate Coverage: 50%

Upstream

Downstream

Crossing Comments: none

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	No data	No data	No data
5	No data	No data	No data
25	No data	No data	No data
50	No data	No data	No data
100	No data	No data	No data
200	No data	No data	No data

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 1
Structure Comments: none
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Box/Bridge with Abutments, Headwall
Inlet Drop/Grade: At Stream Grade
Width: 3.0, Height: 2.0
Substrate/Water Width: 2.30
Water Depth: 0.50

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.10
Width: 1.4, Height: 1.4
Substrate/Water Width: 1.00
Water Depth: 0.30

Location
Coordinates: 42.10146, -73.86545
Location Description: Marsh Meadow Farm- Goat meat for sale!
Date Observed: 7/7/2015
Survey ID: 26334

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.75
Road Ownership: Town

Results
Barrier Evaluation: Insignificant barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 30.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: Comparable
Substrate Type: Silt
Substrate Coverage: 100%

Upstream

Downstream

Crossing Comments: none

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	0.2	0.2	FAIL
5	0.3	0.2	FAIL
25	0.6	0.2	FAIL
50	0.7	0.2	FAIL
100	0.9	0.2	FAIL
200	1.1	0.2	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 2.8
Structure Comments: Tiny!
Outlet Armoring: None

Inlet

Inlet Shape/Type: Round Culvert, Head-wall
Inlet Drop/Grade: At Stream Grade
Width: 0.9, Height: 0.8
Substrate/Water Width: 0.80
Water Depth: 0.20

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 0.9, Height: 0.7
Substrate/Water Width: 0.70
Water Depth: 0.10

Road: Lasher Road **Stream:** unknown

Location
Coordinates: 42.10177, -73.84652
Location Description: Farm on pond
Date Observed: 6/29/2015
Survey ID: 29372

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.00
Road Ownership: Town

Results
Barrier Evaluation: Severe barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 32.70
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: Concrete with metal in between concrete; pond upstream feeds into culvert; upstream pic labeled as outlet; inlet pic not labeled with chalkboard

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.3	0.8	FAIL
5	2.8	0.8	FAIL
25	6.1	0.8	FAIL
50	7.6	0.8	FAIL
100	9.3	0.8	FAIL
200	11.4	0.8	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 5
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Projecting
Inlet Drop/Grade: At Stream Grade
Width: 2.0, Height: 2.0
Substrate/Water Width: 1.20
Water Depth: 0.10

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall Onto Cascade
Drop to Stream Surface/Bottom: 2.50/4.20
Width: 2.6, Height: 2.6
Substrate/Water Width: 0.80
Water Depth: 0.10

Road: Lasher Road **Stream:** unknown

Location

Coordinates: 42.10160, -73.84940
Location Description: Lasher Road
Date Observed: 6/29/2015
Survey ID: 29373

Road

Road Type/Surface: Paved
Road Fill Height (feet): 0.80
Road Ownership: Town

Results

Barrier Evaluation: Moderate barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics

Crossing Type: Culvert
Length: 40.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics

Scour Pool: Large
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: Frogs!

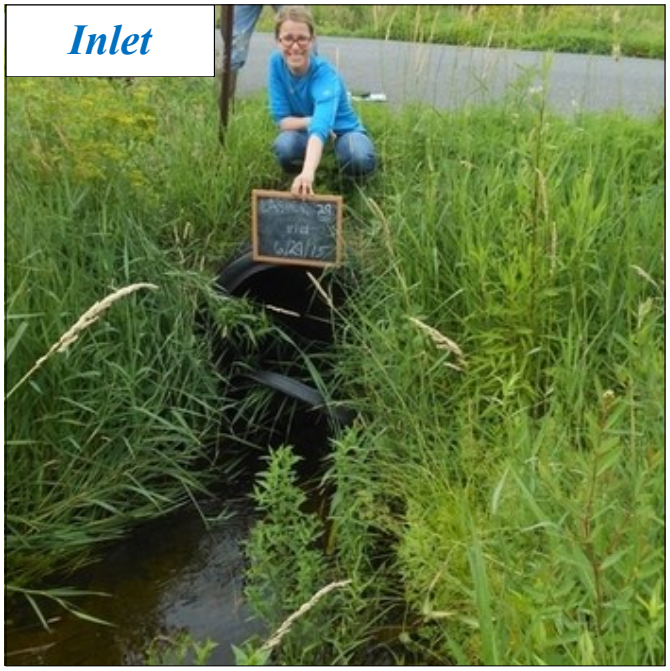
Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	2.6	0.9	FAIL
5	6.8	0.9	FAIL
25	17.7	0.9	FAIL
50	22.9	0.9	FAIL
100	28.9	0.9	FAIL
200	36.3	0.9	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 1.6
Structure Comments: No data
Outlet Armoring: None

Inlet



Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 2.6, Height: 2.6
Substrate/Water Width: 1.80
Water Depth: 0.70

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.20/1.30
Width: 2.7, Height: 2.7
Substrate/Water Width: 1.80
Water Depth: 0.70

111

Road: Lasher Road **Stream:** unknown

Location

Coordinates: 42.10197, -73.85291
Location Description: Near intersection with South Road
Date Observed: 6/29/2015
Survey ID: 29374

Road

Road Type/Surface: Paved
Road Fill Height (feet): 1.25
Road Ownership: Town

Results

Barrier Evaluation: Severe barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics

Crossing Type: Culvert
Length: 51.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics

Scour Pool: Large
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: no comments

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	2.1	1.0	FAIL
5	3.8	1.0	FAIL
25	7.6	1.0	FAIL
50	9.2	1.0	FAIL
100	11.1	1.0	FAIL
200	13.5	1.0	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 1.7
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Wingwalls
Inlet Drop/Grade: At Stream Grade
Width: 2.5, Height: 2.8
Substrate/Water Width: 0.80
Water Depth: 0.50

Outlet

Outlet Shape:
Outlet Drop/Grade: Cascade
Drop to Stream Surface/Bottom: 1.30/2.80
Width: 2.5, Height: 2.5
Substrate/Water Width: 0.90
Water Depth: 0.10

Road: Lasher Road **Stream:** unknown

Location
Coordinates: 42.10191, -73.85486
Location Description: approximately 1/4 mile from intersection
Date Observed: 6/29/2015
Survey ID: 29375

Road
Road Type/Surface: Paved
Road Fill Height (feet): 4.00
Road Ownership: Town

Results
Barrier Evaluation: Moderate barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 47.90
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: No-Deeper/No-Faster
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: no comments

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	3.2	1.7	FAIL
5	9.4	1.7	FAIL
25	27.0	1.7	FAIL
50	35.8	1.7	FAIL
100	45.8	1.7	FAIL
200	58.7	1.7	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 2.5
Structure Comments: Outlet rusted out
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Projecting
Inlet Drop/Grade: At Stream Grade
Width: 2.5, Height: 2.5
Substrate/Water Width: 2.50
Water Depth: 1.90

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 3.0, Height: 2.6
Substrate/Water Width: 3.00
Water Depth: 1.50

Road: Lasher Road **Stream:** unknown

Location

Coordinates: 42.10178, -73.85898
Location Description: Lasher Road
Date Observed: 6/29/2015
Survey ID: 29376

Road

Road Type/Surface: Paved
Road Fill Height (feet): 2.50
Road Ownership: Town

Results

Barrier Evaluation: Moderate barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics

Crossing Type: Culvert
Length: 40.50
Number of structures/cells: 1
Alignment: Skewed (>45°)
Dry Passage/Height: No

Stream Characteristics

Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Shallower/Yes
Substrate Matches Stream: Contrasting
Substrate Type: Gravel
Substrate Coverage: Unknown

Upstream

Downstream

Crossing Comments: stagnant water - unsure which side is the inlet and which is the outlet

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	0.2	0.2	FAIL
5	0.3	0.2	FAIL
25	0.6	0.2	FAIL
50	0.7	0.2	FAIL
100	0.8	0.2	FAIL
200	1.0	0.2	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 2
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Projecting
Inlet Drop/Grade: Perched
Width: 1.0, Height: 1.0
Substrate/Water Width: 0.90
Water Depth: 0.40

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 1.2, Height: 0.8
Substrate/Water Width: 0.80
Water Depth: 0.10

Road: Old Saw Mill Road **Stream:** unknown

Location
Coordinates: 42.12830, -73.86234
Location Description: 400 Old Saw Mill Road
Date Observed: 6/29/2015
Survey ID: 29338

Road
Road Type/Surface: Paved
Road Fill Height (feet): 1.00
Road Ownership: Town

Results
Barrier Evaluation: Significant barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 28.50
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: Took slope at outlet; Pond just upstream of culvert

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	0.2	0.2	FAIL
5	0.4	0.2	FAIL
25	0.7	0.2	FAIL
50	0.9	0.2	FAIL
100	1.0	0.2	FAIL
200	1.2	0.2	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None
Slope Matches Stream (%): 2.8
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Projecting
Inlet Drop/Grade: At Stream Grade
Width: 1.2, Height: 1.1
Substrate/Water Width: 0.80
Water Depth: 0.20

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.70/0.90
Width: 1.2, Height: 1.1
Substrate/Water Width: 0.40
Water Depth: 0.05

Road: Old Saw Mill Road **Stream:** unknown

Location
Coordinates: 42.11555, -73.86296
Location Description: Old Sawmill Road and Best Lane crossing
Date Observed: 6/29/2015
Survey ID: 29362

Road
Road Type/Surface: Paved
Road Fill Height (feet): 0.90
Road Ownership: Town

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Multiple Culvert
Length: 30.00
Number of structures/cells: 2
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Deeper/Yes
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: Chalk board in pictures is labeled Best Lane but should say Old Sawmill Road

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.1	0.5	FAIL
5	3.7	0.5	FAIL
25	11.7	0.5	FAIL
50	15.8	0.5	FAIL
100	20.5	0.5	FAIL
200	26.6	0.5	FAIL

Structure 1 of 2

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 1.4
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Projecting
Inlet Drop/Grade: Perched
Width: 2.0, Height: 2.2
Substrate/Water Width: 1.90
Water Depth: 0.60

Outlet

Outlet Shape: Round Culvert
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 1.00/1.20
Width: 2.0, Height: 2.0
Substrate/Water Width: 1.50
Water Depth: 0.30

Structure 2 of 2

Material: Plastic
Physical Barrier(s)/Severity: None/None
Internal Features/Structures: None

Slope Matches Stream (%): 1.80
Structure Comments: No data

Inlet

Inlet Shape/Type: Round Culvert, Projecting
Inlet Drop/Grade: At Stream Grade
Dimensions:
Width: 2.00, Height: 2.20
Substrate/Water Width: 1.90
Water Depth: 0.60

Outlet

Outlet Shape: Round Culvert
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.10, 1.30
Dimensions:
Width: 2.00, Height: 2.00
Substrate/Water Width: 1.30
Water Depth: 0.20

For additional data, see Appendix

Road: Reuter **Stream:** Unknown

Location
Coordinates: 42.12483, -73.87838
Location Description: Rueternal rd
Date Observed: 10/19/2017
Survey ID: 55440

Road
Road Type/Surface: Paved
Road Fill Height (feet): 0.50
Road Ownership: Town

Results
Barrier Evaluation: Moderate barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 40.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.6	1.2	FAIL
5	5.0	1.2	FAIL
25	15.3	1.2	FAIL
50	20.4	1.2	FAIL
100	26.2	1.2	FAIL
200	33.6	1.2	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: Not Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 3.0, Height: 3.0
Substrate/Water Width: 1.70
Water Depth: 0.30

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.30/0.60
Width: 3.0, Height: 3.0
Substrate/Water Width: 0.40
Water Depth: 0.10

Additional Photos

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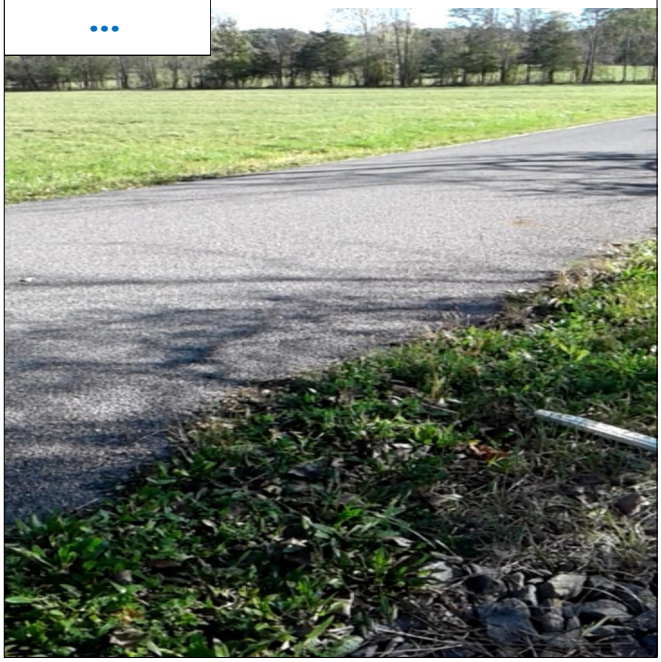

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Road: Reuter **Stream:** Unknown

Location
Coordinates: 42.12481, -73.87583
Location Description: Reuters rd
Date Observed: 10/20/2017
Survey ID: 55711

Road
Road Type/Surface: Paved
Road Fill Height (feet): 1.50
Road Ownership: Town

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 5

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 30.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: Contrasting
Substrate Type: Cobble
Substrate Coverage: 25%

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	0.1	0.6	PASS
5	0.4	0.6	PASS
25	2.5	0.6	FAIL
50	3.9	0.6	FAIL
100	5.8	0.6	FAIL
200	8.3	0.6	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: Debris/ Sediment/Rock, Minor

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: Not Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 2.0, Height: 2.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 2.0, Height: 2.0
Substrate/Water Width: 1.20
Water Depth: 0.00

Additional Photos

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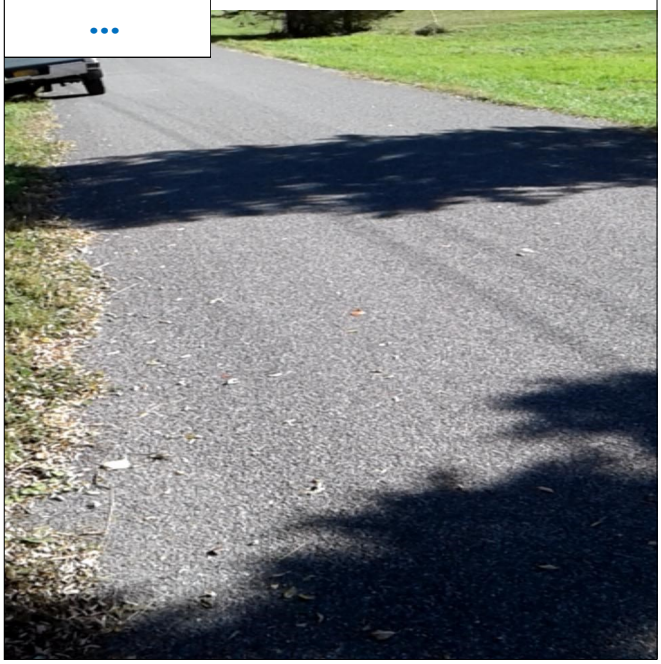

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Road: Round Top **Stream:** None

Location
Coordinates: 42.11921, -73.87391
Location Description: Round top rd
Date Observed: 10/19/2017
Survey ID: 55436

Road
Road Type/Surface: Paved
Road Fill Height (feet): 0.50
Road Ownership: Town

Results
Barrier Evaluation: Severe barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 36.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	0.7	0.2	FAIL
5	1.4	0.2	FAIL
25	3.2	0.2	FAIL
50	4.0	0.2	FAIL
100	4.9	0.2	FAIL
200	6.1	0.2	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: Inlet controls pond level

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: Perched
Width: 1.5, Height: 1.5
Substrate/Water Width: 0.00
Water Depth: 0.00

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 2.00/2.50
Width: 1.5, Height: 1.5
Substrate/Water Width: 0.00
Water Depth: 0.00

Additional Photos

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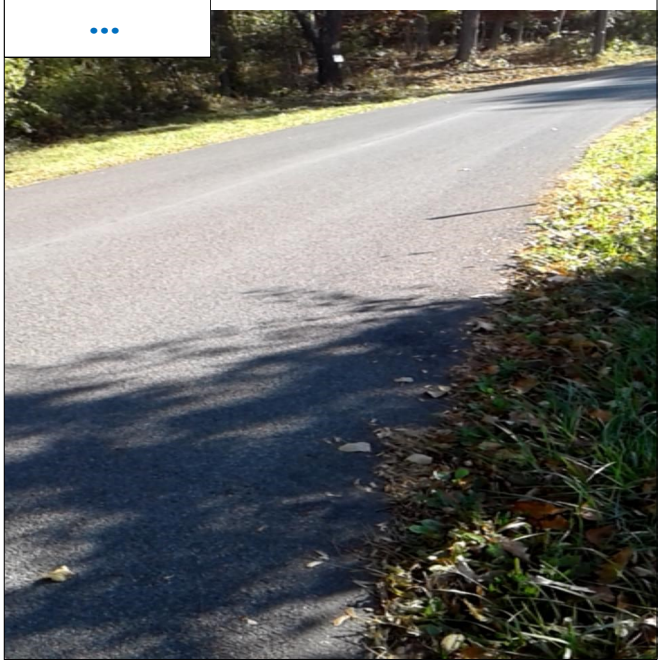

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Road: Round Top **Stream:** Unknown

Location
Coordinates: 42.11969, -73.87914
Location Description: Round top rd
Date Observed: 10/19/2017
Survey ID: 55437

Road
Road Type/Surface: Paved
Road Fill Height (feet): 0.70
Road Ownership: Town

Results
Barrier Evaluation: Significant barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 37.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	0.8	0.3	FAIL
5	2.1	0.3	FAIL
25	5.4	0.3	FAIL
50	6.9	0.3	FAIL
100	8.6	0.3	FAIL
200	10.8	0.3	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 1.5, Height: 1.5
Substrate/Water Width: 0.50
Water Depth: 0.10

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.70/1.40
Width: 1.5, Height: 1.5
Substrate/Water Width: 0.20
Water Depth: 0.10

Additional Photos

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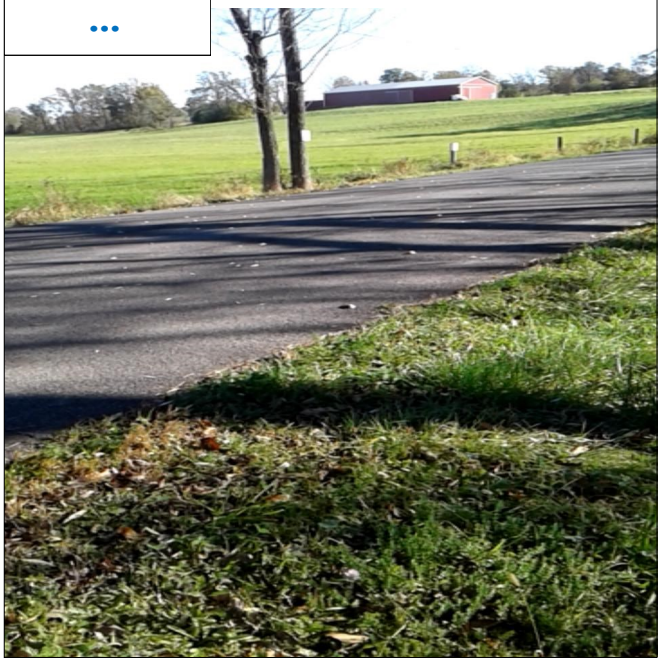

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Road: Sharps landing **Stream:** Unknown

Location
Coordinates: 42.14449, -73.88917
Location Description: Sharps landing rd
Date Observed: 10/25/2017
Survey ID: 55688

Road
Road Type/Surface: Paved
Road Fill Height (feet): 0.50
Road Ownership: Town

Results
Barrier Evaluation: Insignificant barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 33.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: Comparable
Substrate Type: Silt
Substrate Coverage: 25%

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.6	1.3	FAIL
5	3.1	1.3	FAIL
25	6.4	1.3	FAIL
50	7.8	1.3	FAIL
100	9.4	1.3	FAIL
200	11.5	1.3	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: Free Fall, Minor

Slope Matches Stream (%): No data
Structure Comments: Small Free fall in-side crossing

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 3.0, Height: 3.0
Substrate/Water Width: 0.80
Water Depth: 0.10

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 2.0, Height: 2.0
Substrate/Water Width: 2.00
Water Depth: 0.30

Additional Photos

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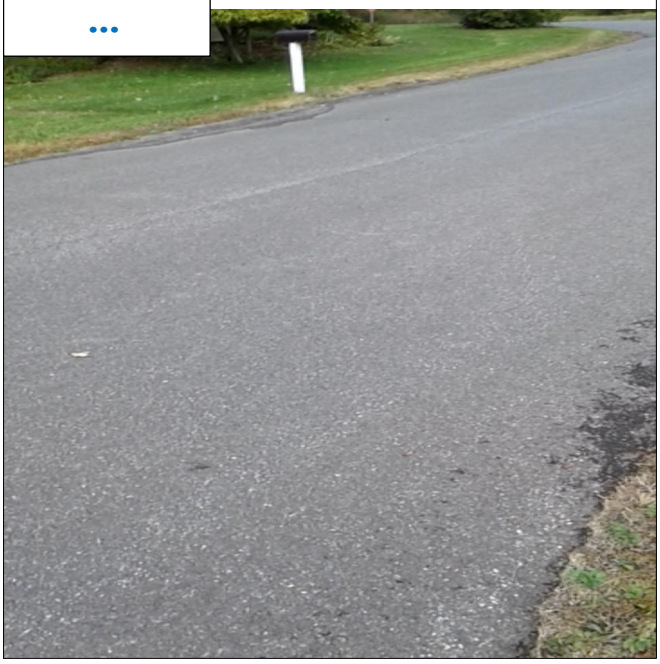

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For additional data, see Appendix

Road: Viewmont Ave **Stream:** unnamed

Location
Coordinates: 42.10456, -73.87355
Location Description: Telephone Pole 43
Date Observed: 7/7/2015
Survey ID: 26327

Road
Road Type/Surface: Paved
Road Fill Height (feet): 3.00
Road Ownership: Town

Results
Barrier Evaluation: Insignificant barrier
Aquatic Organism Passage Score: Full AOP
Condition/Maintenance: OK
Max Return Interval: 1

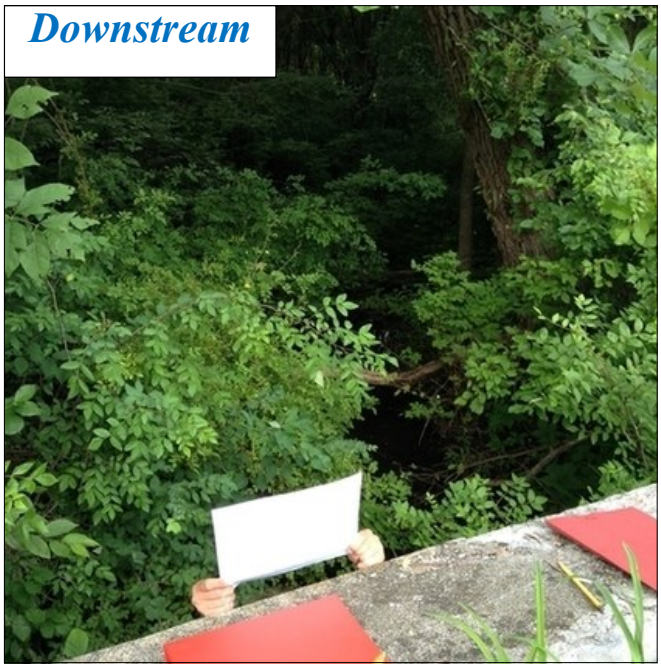
Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 51.10
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: Comparable
Substrate Type: Silt
Substrate Coverage: 100%

Upstream

Downstream



Crossing Comments: Inlet is broken and angled at 45 degrees to abutments

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.1	1.0	FAIL
5	2.7	1.0	FAIL
25	6.3	1.0	FAIL
50	8.0	1.0	FAIL
100	9.9	1.0	FAIL
200	12.3	1.0	FAIL

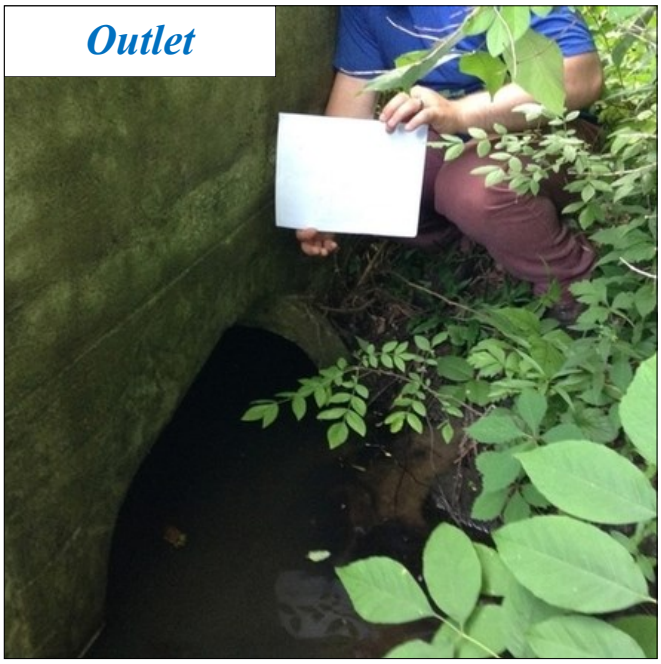
Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 0.6
Structure Comments: Material is clay.
Raccoon skull

Inlet

Outlet



Inlet

Inlet Shape/Type: Round Culvert, Head-wall
Inlet Drop/Grade: At Stream Grade
Width: 2.0, Height: 2.0
Substrate/Water Width: 1.80
Water Depth: 1.00

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 2.0, Height: 1.5
Substrate/Water Width: 1.80
Water Depth: 1.00

Road: Woods **Stream:** Unknown

Location
Coordinates: 42.11581, -73.90130
Location Description: Woods and orchard rd
Date Observed: 10/25/2017
Survey ID: 55652

Road
Road Type/Surface: Paved
Road Fill Height (feet): 1.00
Road Ownership: Town

Results
Barrier Evaluation: Severe barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: Poor
Max Return Interval: No data

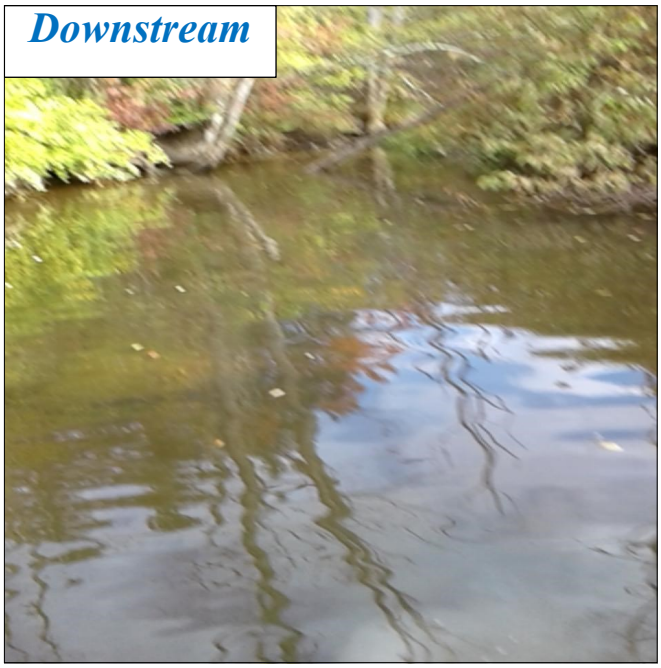
Stream and Crossing

Crossing Characteristics
Crossing Type: Bridge
Length: 60.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream



Crossing Comments: Broken outlet wingwalls

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	No data	No data	No data
5	No data	No data	No data
25	No data	No data	No data
50	No data	No data	No data
100	No data	No data	No data
200	No data	No data	No data

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Box/Bridge with Abutments, None
Inlet Drop/Grade: At Stream Grade
Width: 5.0, Height: 5.0
Substrate/Water Width: 1.50
Water Depth: 0.20

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 1.80/2.40
Width: 5.0, Height: 5.0
Substrate/Water Width: 0.90
Water Depth: 0.10

Additional Photos

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County-owned Structures

Road: CR 10 **Stream:** Unknown

Location
Coordinates: 42.13314, -73.88827
Location Description: 147 County 8
Date Observed: 10/31/2017
Survey ID: 55724

Road
Road Type/Surface: Paved
Road Fill Height (feet): 1.00
Road Ownership: County

Results
Barrier Evaluation: no score - missing data
Aquatic Organism Passage Score: no score - missing data
Condition/Maintenance: OK
Max Return Interval: No data

Stream and Crossing

Crossing Characteristics
Crossing Type: Partially Inaccessible
Length: No data
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: NULL

Stream Characteristics
Scour Pool: Unknown
Water Depth/Velocity Matches Stream: NULL/NULL
Substrate Matches Stream: NULL
Substrate Type: NULL
Substrate Coverage: NULL

Upstream

Downstream

Crossing Comments: Unknown outlet

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	No data	No data	No data
5	No data	No data	No data
25	No data	No data	No data
50	No data	No data	No data
100	No data	No data	No data
200	No data	No data	No data

Structure 1 of 1

Material: No data
Physical Barrier (s)/Severity:, NULL
Internal Features/Structures: No data

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: NULL

Inlet

Outlet

Inlet

Inlet Shape/Type: No data, No data
Inlet Drop/Grade: No data
Width: No data, Height: No data
Substrate/Water Width: No data
Water Depth: No data

Outlet

Outlet Shape: No data
Outlet Drop/Grade: NULL
Drop to Stream Surface/Bottom: No data/-No data
Width: No data, Height: No data
Substrate/Water Width: -No data
Water Depth: No data

Additional Photos

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Location
Coordinates: 42.10969, -73.87927
Location Description: County 33
Date Observed: 10/19/2017
Survey ID: 55434

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.00
Road Ownership: County

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: Poor
Max Return Interval: 2

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 33.00
Number of structures/cells: 1
Alignment: Skewed (>45°)
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: Old concrete culvert

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	0.4	0.8	PASS
5	1.0	0.8	FAIL
25	2.4	0.8	FAIL
50	3.1	0.8	FAIL
100	3.8	0.8	FAIL
200	4.7	0.8	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 2.0, Height: 2.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.30/0.30
Width: 2.0, Height: 2.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Additional Photos

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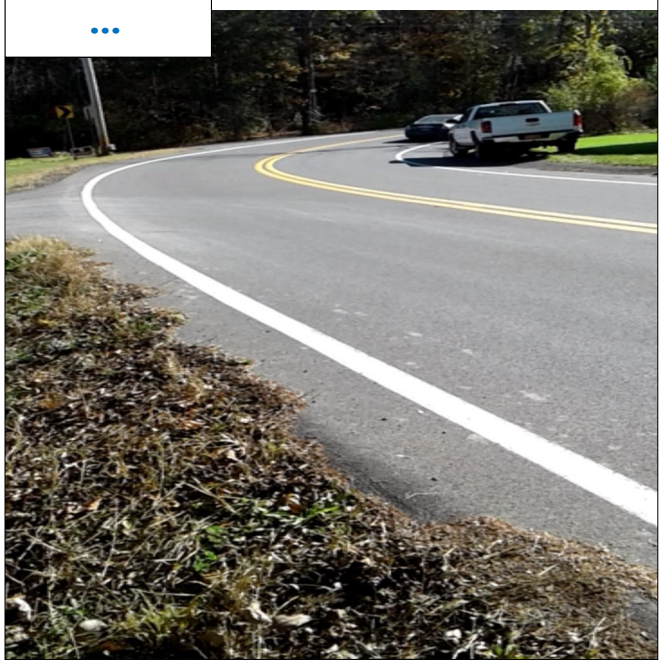

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Road: CR 35A **Stream:** unknown

Location
Coordinates: 42.15154, -73.88296
Location Description: Just off 9g
Date Observed: 10/26/2017
Survey ID: 55698

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.50
Road Ownership: County

Results
Barrier Evaluation: Moderate barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 30.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: Contrasting
Substrate Type: Unknown
Substrate Coverage: 75%

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	2.0	0.9	FAIL
5	3.3	0.9	FAIL
25	6.0	0.9	FAIL
50	7.3	0.9	FAIL
100	8.7	0.9	FAIL
200	10.5	0.9	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: Debris/ Sediment/Rock, Moderate

Slope Matches Stream (%): No data
Structure Comments: Clogged with grass and silt

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Head-wall
Inlet Drop/Grade: Inlet Drop
Width: 2.0, Height: 2.0
Substrate/Water Width: 1.40
Water Depth: 0.40

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.40/1.00
Width: 2.0, Height: 2.0
Substrate/Water Width: 1.10
Water Depth: 0.00

Additional Photos

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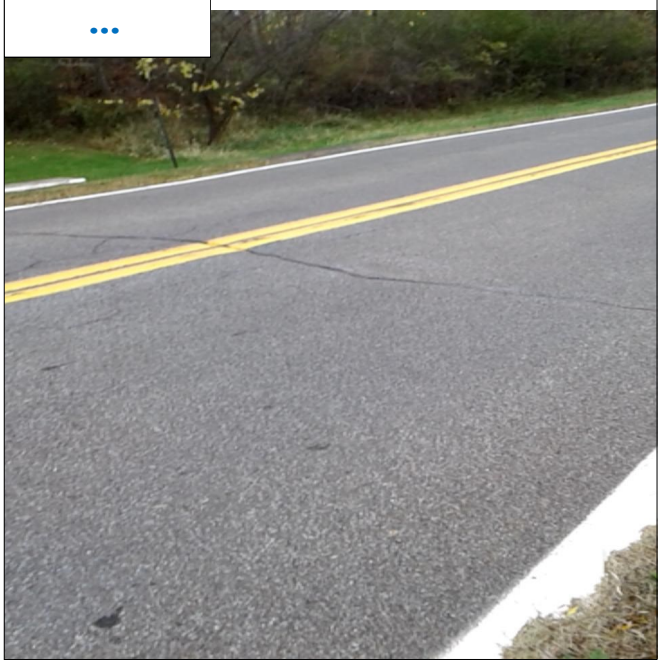

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Road: CR 35A **Stream:** Unknown

Location
Coordinates: 42.15491, -73.88321
Location Description: 72 County 35a
Date Observed: 10/26/2017
Survey ID: 55700

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.50
Road Ownership: County

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 49.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: No-Deeper/No-Slower
Substrate Matches Stream: Contrasting
Substrate Type: Gravel
Substrate Coverage: 75%

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.8	1.1	FAIL
5	3.0	1.1	FAIL
25	5.4	1.1	FAIL
50	6.6	1.1	FAIL
100	7.9	1.1	FAIL
200	9.5	1.1	FAIL

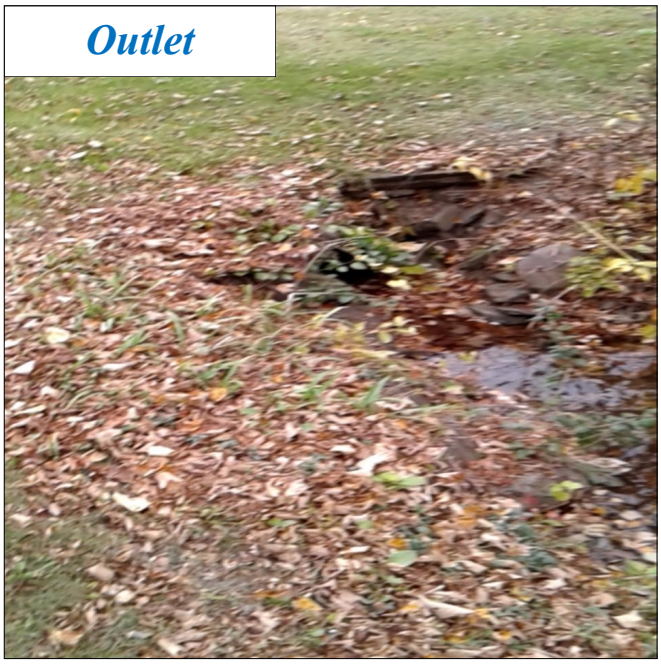
Structure 1 of 1

Material: Metal
Physical Barrier (s)/Severity: Debris/ Sediment/Rock, Minor

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet



Inlet

Inlet Shape/Type: Round Culvert, Head-wall
Inlet Drop/Grade: Inlet Drop
Width: 2.3, Height: 1.8
Substrate/Water Width: 2.10
Water Depth: 0.70

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 2.0, Height: 2.0
Substrate/Water Width: 1.40
Water Depth: 0.50

Additional Photos

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Road: CR 35A **Stream:** Unknown

Location
Coordinates: 42.16608, -73.87083
Location Description: County 35a
Date Observed: 10/26/2017
Survey ID: 55701

Road
Road Type/Surface: Paved
Road Fill Height (feet): 20.00
Road Ownership: County

Results
Barrier Evaluation: Severe barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 100

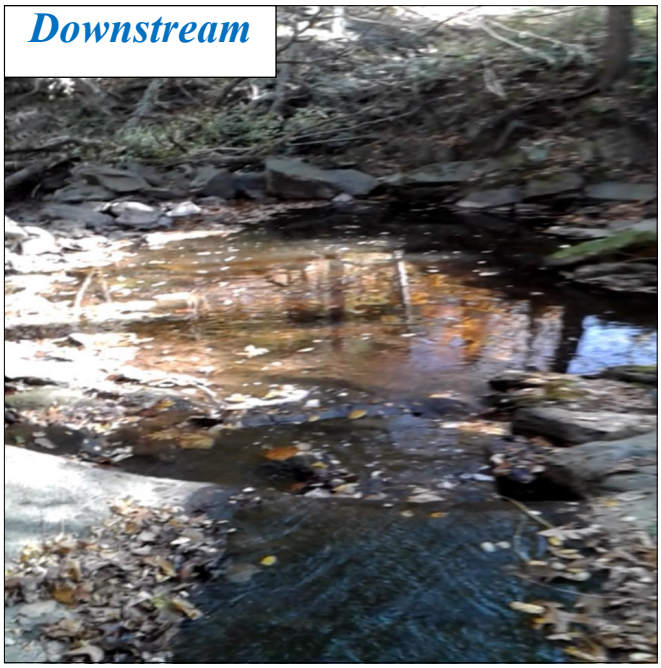
Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 200.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream



Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	15.3	107.6	PASS
5	30.3	107.6	PASS
25	64.9	107.6	PASS
50	80.7	107.6	PASS
100	98.3	107.6	PASS
200	120.5	107.6	FAIL

Structure 1 of 1

Material: Combination
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Pipe Arch/Elliptical Culvert, Mitered to Slope
Inlet Drop/Grade: At Stream Grade
Width: 15.0, Height: 15.0
Substrate/Water Width: 2.50
Water Depth: 0.10

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 3.30/4.20
Width: 15.0, Height: 25.0
Substrate/Water Width: 2.20
Water Depth: 0.10

Additional Photos

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Road: CR 8 **Stream:** Unknown

Location
Coordinates: 42.13263, -73.87751
Location Description: 248 County 8
Date Observed: 10/19/2017
Survey ID: 55445

Road
Road Type/Surface: Paved
Road Fill Height (feet): 3.00
Road Ownership: County

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: No data

Stream and Crossing

Crossing Characteristics
Crossing Type: Bridge
Length: 32.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Unknown/Unknown
Substrate Matches Stream: Comparable
Substrate Type: Silt
Substrate Coverage: 100%

Upstream

Downstream

Crossing Comments: New bridge over old 3ft dam upstream of inlet

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	No data	No data	No data
5	No data	No data	No data
25	No data	No data	No data
50	No data	No data	No data
100	No data	No data	No data
200	No data	No data	No data

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: Debris/ Sediment/Rock, Moderate

Slope Matches Stream (%): No data
Structure Comments: Damned up
Outlet Armoring: Not Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Open Bottom Arch Bridge/Culvert, Headwall
Inlet Drop/Grade: Inlet Drop
Width: 7.5, Height: 3.0
Substrate/Water Width: 7.50
Water Depth: 0.50

Outlet

Outlet Shape:
Outlet Drop/Grade: Clogged/Collapsed/ Submerged
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 7.5, Height: 2.5
Substrate/Water Width: 7.50
Water Depth: 0.10

Additional Photos

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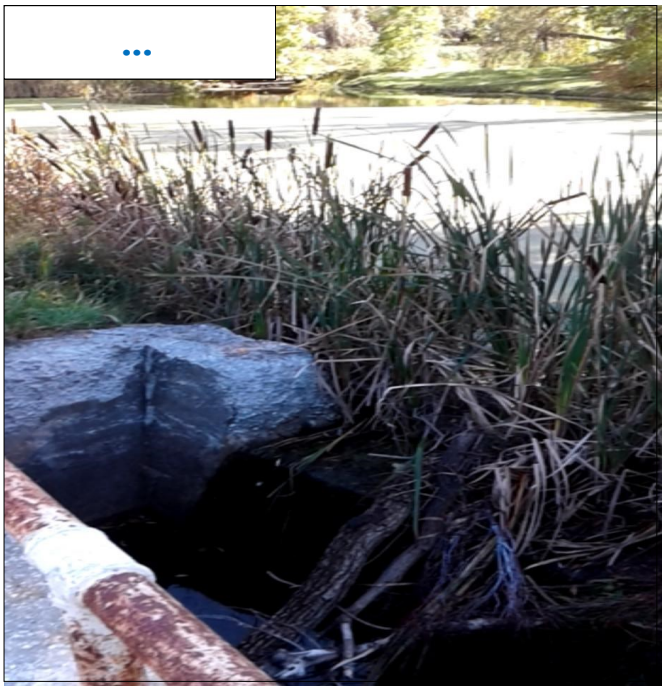

Road: Route 33 **Stream:** unknown

Location
Coordinates: 42.16007, -73.86706
Location Description: Pond upstream near 'windy road' sign
Date Observed: 6/27/2015
Survey ID: 20601

Road
Road Type/Surface: Paved
Road Fill Height (feet): 3.30
Road Ownership: County

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 35.50
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: Inlet section 3' in disconnected/ fallen out.

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	0.7	0.5	FAIL
5	1.1	0.5	FAIL
25	2.0	0.5	FAIL
50	2.3	0.5	FAIL
100	2.8	0.5	FAIL
200	3.3	0.5	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 0.6
Structure Comments: pond upstream
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Projecting
Inlet Drop/Grade: At Stream Grade
Width: 1.5, Height: 1.3
Substrate/Water Width: 0.90
Water Depth: 0.20

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 1.8, Height: 1.0
Substrate/Water Width: 1.80
Water Depth: 0.40

Road: Route 8 **Stream:** unknown

Location
Coordinates: 42.13222, -73.86820
Location Description: Intersection of Route 8 & Hill Top Road
Date Observed: 6/29/2015
Survey ID: 22190

Road
Road Type/Surface: Paved
Road Fill Height (feet): 0.90
Road Ownership: County

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: New
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 34.60
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Deeper/Yes
Substrate Matches Stream: Comparable
Substrate Type: Silt
Substrate Coverage: 100%

Upstream

Downstream

Crossing Comments: Persistent rain on previous day

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.0	0.9	FAIL
5	1.8	0.9	FAIL
25	3.5	0.9	FAIL
50	4.2	0.9	FAIL
100	5.0	0.9	FAIL
200	6.1	0.9	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 3.4
Structure Comments: No data
Outlet Armoring: Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Wingwalls
Inlet Drop/Grade: At Stream Grade
Width: 2.4, Height: 2.4
Substrate/Water Width: 2.10
Water Depth: 0.40

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 2.3, Height: 2.3
Substrate/Water Width: 2.30
Water Depth: 1.10

Road: Route 8 **Stream:** unknown

Location
Coordinates: 42.13221, -73.86731
Location Description: East of Hill Top & Route 8 crossing
Date Observed: 6/29/2015
Survey ID: 22191

Road
Road Type/Surface: Paved
Road Fill Height (feet): 1.50
Road Ownership: County

Results
Barrier Evaluation: Insignificant barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: Poor
Max Return Interval: 2

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 34.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: Comparable
Substrate Type: Silt
Substrate Coverage: 100%

Upstream

Downstream

Crossing Comments: Culvert drains to seeping wetland

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	0.3	0.4	PASS
5	0.5	0.4	FAIL
25	0.9	0.4	FAIL
50	1.1	0.4	FAIL
100	1.3	0.4	FAIL
200	1.6	0.4	FAIL

Structure 1 of 1

Material: Plastic
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 4.6
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Wingwalls
Inlet Drop/Grade: At Stream Grade
Width: 1.5, Height: 1.5
Substrate/Water Width: 0.40
Water Depth: 0.03

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 1.4, Height: 1.4
Substrate/Water Width: 1.40
Water Depth: 0.70

Additional Photos

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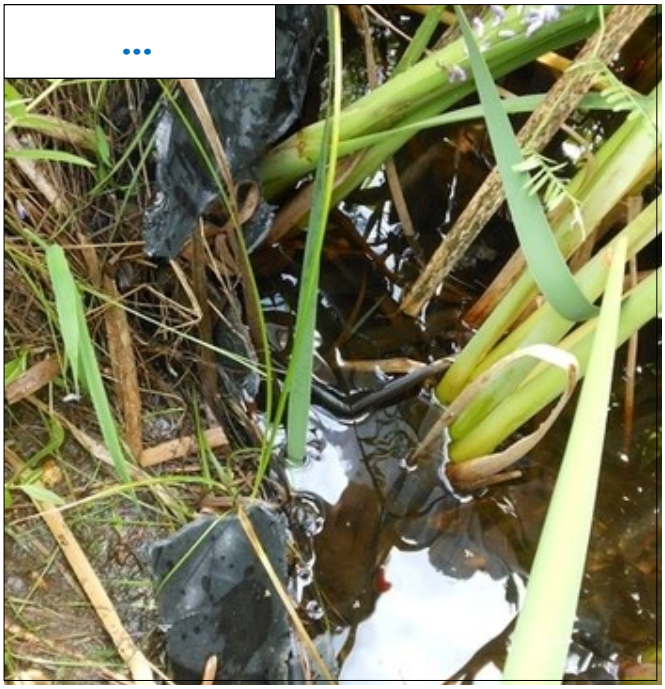

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Road: Route 8 **Stream:** unknown

Location
Coordinates: 42.13134, -73.86495
Location Description: 481 Route 8
Date Observed: 6/29/2015
Survey ID: 29333

Road
Road Type/Surface: Paved
Road Fill Height (feet): 6.00
Road Ownership: County

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 10

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 56.80
Number of structures/cells: 2
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: Old Bridge Crossing to Left when facing upstream (on right when facing downstream)= Structure #2

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.5	13.7	PASS
5	5.6	13.7	PASS
25	23.6	13.7	FAIL
50	33.8	13.7	FAIL
100	45.9	13.7	FAIL
200	62.0	13.7	FAIL

Structure 1 of 2

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 1.6
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, Head-wall
Inlet Drop/Grade: At Stream Grade
Width: 4.0, Height: 4.0
Substrate/Water Width: 4.00
Water Depth: 2.30

Outlet

Outlet Shape: Round Culvert
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 4.0, Height: 4.0
Substrate/Water Width: 3.80
Water Depth: 2.20

Structure 2 of 2

Material: Concrete
Physical Barrier(s)/Severity: Dry/ Moderate
Internal Features/Structures: None

Slope Matches Stream (%): 0.50
Structure Comments: No data

Inlet

Inlet Shape/Type: Box/Bridge with Abutments, Headwall
Inlet Drop/Grade: Perched
Dimensions:
- Width: 7.80, Height: 4.70
- Substrate/Water Width: 0.00
- Water Depth: 0.00

Outlet

Outlet Shape: Box/Bridge with Abutments
Outlet Drop/Grade: Cascade
Drop to Stream Surface/Bottom: 2.00, 4.20
Dimensions:
- Width: 7.80, Height: 4.70
- Substrate/Water Width: 0.00
- Water Depth: 0.00

For additional data, see Appendix

Additional Photos

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Road: Route 8 **Stream:** unknown

Location
Coordinates: 42.12737, -73.85587
Location Description: just west of Eastern Parkway
Date Observed: 6/29/2015
Survey ID: 29344

Road
Road Type/Surface: Paved
Road Fill Height (feet): 2.25
Road Ownership: County

Results
Barrier Evaluation: Insignificant barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: No data

Stream and Crossing

Crossing Characteristics
Crossing Type: Bridge
Length: 27.80
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Yes/No-Faster
Substrate Matches Stream: Comparable
Substrate Type: Gravel
Substrate Coverage: 100%

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	No data	No data	No data
5	No data	No data	No data
25	No data	No data	No data
50	No data	No data	No data
100	No data	No data	No data
200	No data	No data	No data

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): 1.3
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Box/Bridge with Abutments, Headwall and Wingwalls
Inlet Drop/Grade: At Stream Grade
Width: 4.0, Height: 3.4
Substrate/Water Width: 4.00
Water Depth: 0.40

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 4.0, Height: 3.6
Substrate/Water Width: 4.00
Water Depth: 0.80

State-owned Structures

Road: 9G **Stream: Unknown**

Location
Coordinates: 42.14023, -73.88852
Location Description: 4387 9g
Date Observed: 10/25/2017
Survey ID: 55654

Road
Road Type/Surface: Paved
Road Fill Height (feet): 3.00
Road Ownership: State

Results
Barrier Evaluation: Moderate barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: Poor
Max Return Interval: No data

Stream and Crossing

Crossing Characteristics
Crossing Type: Bridge
Length: 90.00
Number of structures/cells: 1
Alignment: Skewed (>45°)
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: Unknown
Substrate Type: Unknown
Substrate Coverage: Unknown

Upstream

Downstream

Crossing Comments: Double crossing

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	No data	No data	No data
5	No data	No data	No data
25	No data	No data	No data
50	No data	No data	No data
100	No data	No data	No data
200	No data	No data	No data

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: Deformation, Minor

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: Not Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Box/Bridge with Abutments, Headwall and Wingwalls
Inlet Drop/Grade: Perched
Width: 3.5, Height: 2.2
Substrate/Water Width: 0.50
Water Depth: 0.10

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 4.5, Height: 2.0
Substrate/Water Width: 4.50
Water Depth: 0.40

Additional Photos

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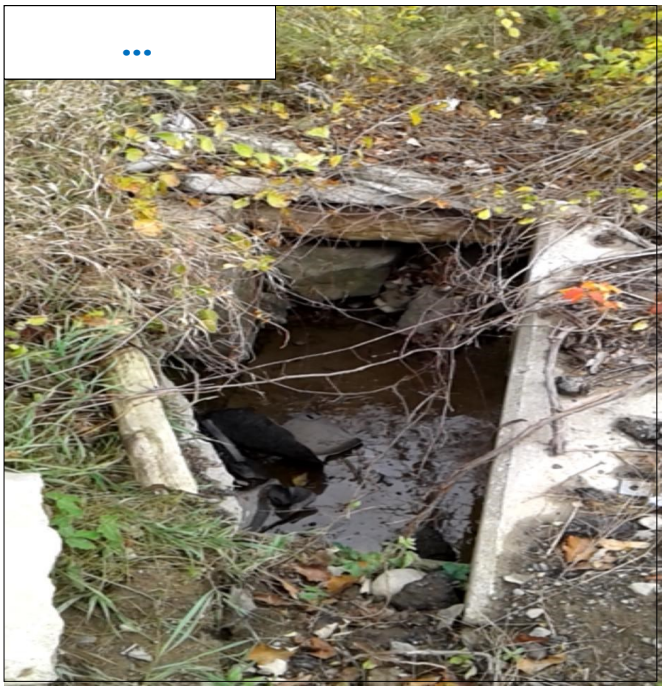

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Road: 9G **Stream: Unknown**

Location
Coordinates: 42.13572, -73.89088
Location Description: Near stewarts
Date Observed: 10/25/2017
Survey ID: 55686

Road
Road Type/Surface: Paved
Road Fill Height (feet): 6.00
Road Ownership: State

Results
Barrier Evaluation: Significant barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 300.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: Unknown
Substrate Type: Unknown
Substrate Coverage: Unknown

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	5.5	4.9	FAIL
5	9.4	4.9	FAIL
25	17.8	4.9	FAIL
50	21.6	4.9	FAIL
100	25.9	4.9	FAIL
200	31.2	4.9	FAIL

Structure 1 of 1

Material: Combination
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Box/Bridge with Abutments, Headwall
Inlet Drop/Grade: At Stream Grade
Width: 6.0, Height: 2.2
Substrate/Water Width: 6.00
Water Depth: 0.10

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.80/1.20
Width: 5.0, Height: 5.0
Substrate/Water Width: 0.90
Water Depth: 0.10

Location
Coordinates: 42.14411, -73.88656
Location Description: North of maple lane. Sharps landing
Date Observed: 10/25/2017
Survey ID: 55687

Road
Road Type/Surface: Paved
Road Fill Height (feet): 7.00
Road Ownership: State

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 2

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 42.00
Number of structures/cells: 1
Alignment: Skewed (>45°)
Dry Passage/Height: No

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Yes/Yes
Substrate Matches Stream: None
Substrate Type: Silt
Substrate Coverage: 75%

Upstream

Downstream

Crossing Comments: Another crossing just downstream

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	1.2	2.4	PASS
5	2.5	2.4	FAIL
25	5.3	2.4	FAIL
50	6.5	2.4	FAIL
100	7.9	2.4	FAIL
200	9.6	2.4	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: Debris/ Sediment/Rock, Moderate

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Box/Bridge with Abutments, None
Inlet Drop/Grade: At Stream Grade
Width: 3.0, Height: 2.0
Substrate/Water Width: 3.00
Water Depth: 0.10

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 3.0, Height: 2.0
Substrate/Water Width: 3.00
Water Depth: 0.10

Additional Photos

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Road: 9G Stream: Unknown

Location
Coordinates: 42.15142, -73.88265
Location Description: Near County 35a
Date Observed: 10/26/2017
Survey ID: 55697

Road
Road Type/Surface: Paved
Road Fill Height (feet): 10.00
Road Ownership: State

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 2

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 44.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: No-Deeper/No-Slower
Substrate Matches Stream: Unknown
Substrate Type: Silt
Substrate Coverage: 100%

Upstream

Downstream

Crossing Comments: Filled with silt

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	2.0	2.8	PASS
5	3.3	2.8	FAIL
25	6.0	2.8	FAIL
50	7.2	2.8	FAIL
100	8.6	2.8	FAIL
200	10.4	2.8	FAIL

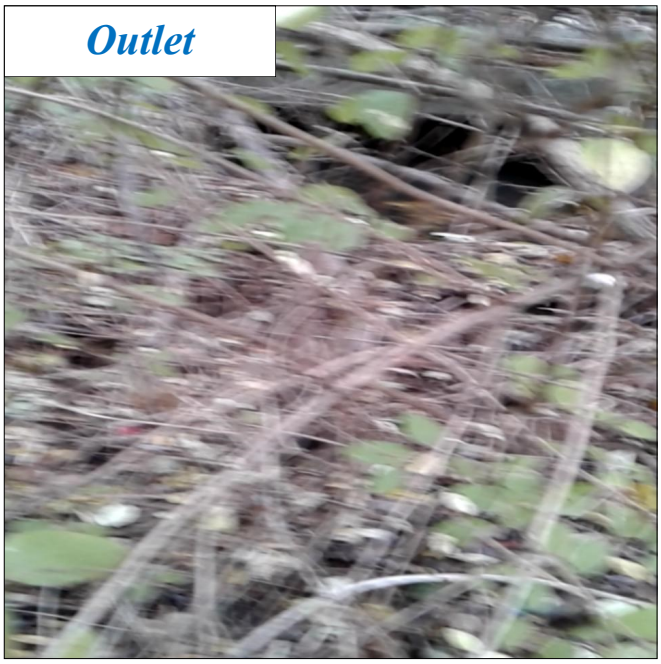
Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: Debris/ Sediment/Rock, Moderate

Slope Matches Stream (%): No data
Structure Comments: Silted in
Outlet Armoring: None

Inlet

Outlet



Inlet

Inlet Shape/Type: Box Culvert, Headwall and Wingwalls
Inlet Drop/Grade: At Stream Grade
Width: 3.0, Height: 2.0
Substrate/Water Width: 3.00
Water Depth: 0.60

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 3.0, Height: 1.5
Substrate/Water Width: 3.00
Water Depth: 0.20

Additional Photos

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Road: 9G **Stream: Unknown**

Location
Coordinates: 42.15744, -73.87258
Location Description: 9 g
Date Observed: 11/2/2017
Survey ID: 55770

Road
Road Type/Surface: Paved
Road Fill Height (feet): 6.00
Road Ownership: State

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 2

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 140.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: Contrasting
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	13.8	18.7	PASS
5	27.8	18.7	FAIL
25	60.2	18.7	FAIL
50	75.1	18.7	FAIL
100	91.6	18.7	FAIL
200	112.4	18.7	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: Not Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Box Culvert, Wingwalls
Inlet Drop/Grade: At Stream Grade
Width: 7.0, Height: 7.0
Substrate/Water Width: 4.20
Water Depth: 0.10

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 7.0, Height: 7.0
Substrate/Water Width: 7.00
Water Depth: 0.70

Additional Photos

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Road: 9G Stream: Unknown

Location
Coordinates: 42.17013, -73.86115
Location Description: 4985 9g
Date Observed: 11/2/2017
Survey ID: 55776

Road
Road Type/Surface: Paved
Road Fill Height (feet): 1.50
Road Ownership: State

Results
Barrier Evaluation: Insignificant barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: Unknown
Max Return Interval: 25

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 70.00
Number of structures/cells: 1
Alignment: Skewed (>45°)
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: None
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: Contrasting
Substrate Type: Gravel
Substrate Coverage: 50%

Upstream

Downstream

Crossing Comments: No flow

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	0.6	1.9	PASS
5	1.0	1.9	PASS
25	1.8	1.9	PASS
50	2.1	1.9	FAIL
100	2.6	1.9	FAIL
200	3.1	1.9	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: None, None
Internal Features/Structures: None

Slope Matches Stream (%): No data
Structure Comments: No data
Outlet Armoring: None

Inlet

Outlet

Inlet

Inlet Shape/Type: Box Culvert, Wingwalls
Inlet Drop/Grade: At Stream Grade
Width: 4.5, Height: 2.2
Substrate/Water Width: 4.50
Water Depth: 0.00

Outlet

Outlet Shape:
Outlet Drop/Grade: Clogged/Collapsed/ Submerged
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 5.0, Height: 1.0
Substrate/Water Width: 5.00
Water Depth: 0.00

Additional Photos

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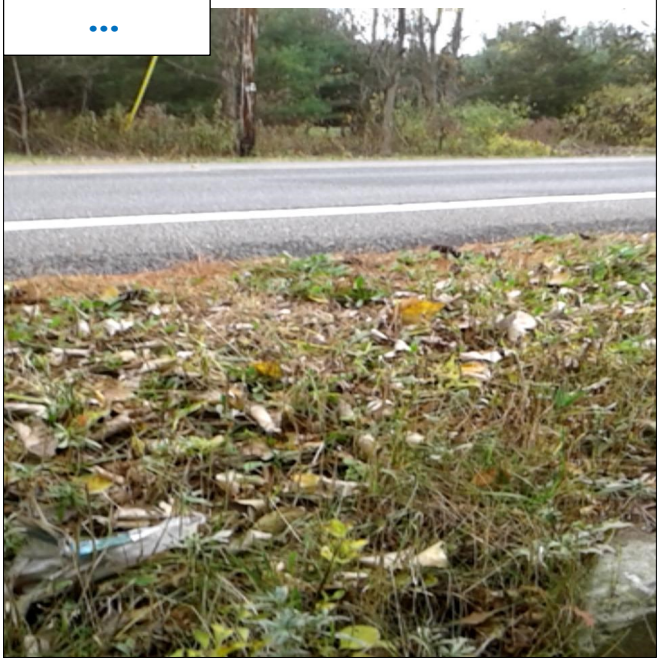

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Railroad-owned Structures

Road: Railroad **Stream:** Unknown

Location
Coordinates: 42.13820, -73.89590
Location Description: Rail rd
Date Observed: 10/20/2017
Survey ID: 55467

Road
Road Type/Surface: Railroad
Road Fill Height (feet): 5.00
Road Ownership: Railroad

Results
Barrier Evaluation: Severe barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 1

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 85.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: Unknown
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: Comparable
Substrate Type: Gravel
Substrate Coverage: 50%

Upstream

Downstream

Crossing Comments:

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	6.6	5.3	FAIL
5	11.4	5.3	FAIL
25	21.4	5.3	FAIL
50	25.9	5.3	FAIL
100	31.0	5.3	FAIL
200	37.4	5.3	FAIL

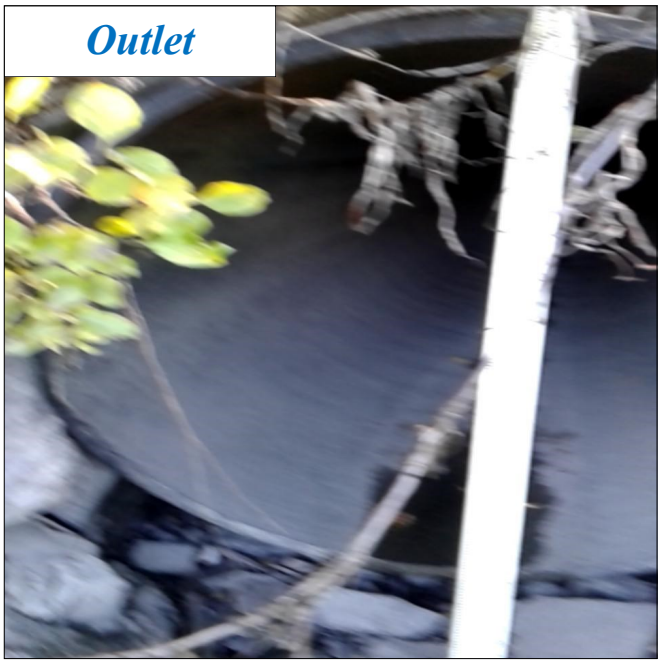
Structure 1 of 1

Material: Combination
Physical Barrier (s)/Severity: Debris/ Sediment/Rock; Free Fall, Moderate

Slope Matches Stream (%): No data
Structure Comments: Dry passage at low tide

Inlet

Outlet



Inlet

Inlet Shape/Type: Box/Bridge with Abutments, Headwall
Inlet Drop/Grade: At Stream Grade
Width: 5.0, Height: 3.0
Substrate/Water Width: 5.00
Water Depth: 0.00

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.80/2.50
Width: 4.0, Height: 4.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Additional Photos

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Road: Railroad **Stream:** Unknown

Location
Coordinates: 42.12478, -73.90526
Location Description: 100 yrds south Cheviot landing
Date Observed: 10/20/2017
Survey ID: 55473

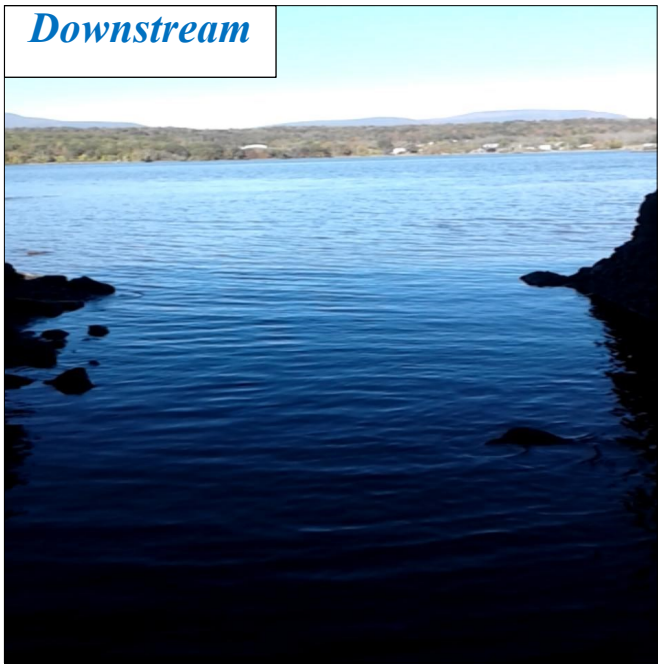
Road
Road Type/Surface: Railroad
Road Fill Height (feet): 2.00
Road Ownership: Railroad

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: No data

Stream and Crossing

Crossing Characteristics
Crossing Type: Bridge
Length: 75.00
Number of structures/cells: 1
Alignment: Skewed (>45°)
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: Comparable
Substrate Type: Gravel
Substrate Coverage: 100%



Crossing Comments: Measured at low tide

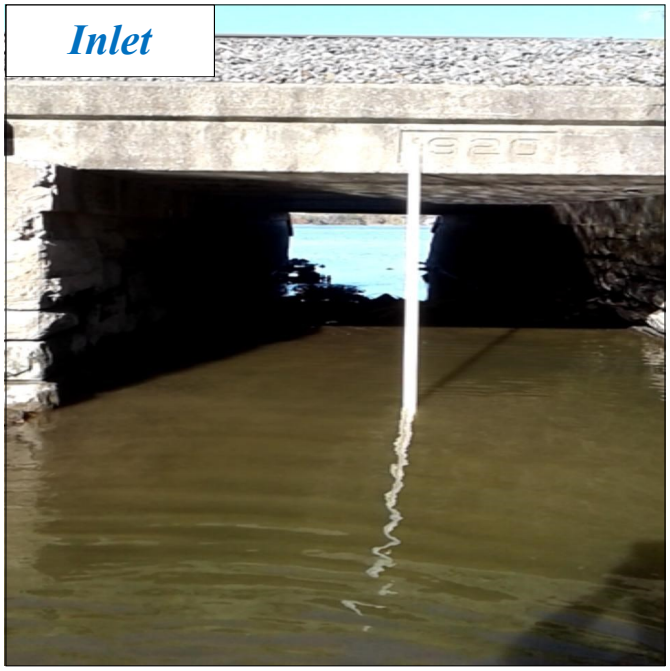
Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	No data	No data	No data
5	No data	No data	No data
25	No data	No data	No data
50	No data	No data	No data
100	No data	No data	No data
200	No data	No data	No data

Structure 1 of 1

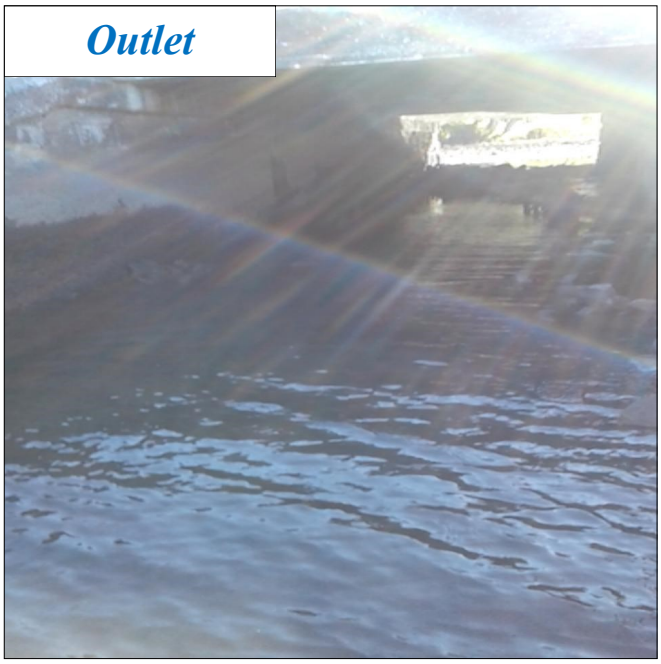
Material: Concrete
Physical Barrier (s)/Severity: Debris/ Sediment/Rock; Free Fall, Moderate

Slope Matches Stream (%): No data
Structure Comments: Debris in crossing creates free fall

Inlet



Outlet



Inlet

Inlet Shape/Type: Box/Bridge with Abut-ments, Headwall
Inlet Drop/Grade: At Stream Grade
Width: 12.0, Height: 7.5
Substrate/Water Width: 12.00
Water Depth: 1.50

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 12.0, Height: 8.0
Substrate/Water Width: 12.00
Water Depth: 1.10

Additional Photos

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Road: Railroad

Stream: Unknown

Location
Coordinates: 42.14282, -73.89425
Location Description: Rail rd
Date Observed: 10/20/2017
Survey ID: 55475

Road
Road Type/Surface: Railroad
Road Fill Height (feet): 6.00
Road Ownership: Railroad

Results
Barrier Evaluation: Moderate barrier
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: Poor
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 100.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Unknown
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: Unknown
Substrate Type: Unknown
Substrate Coverage: Unknown

Upstream

Downstream

Crossing Comments: Totally clogged

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	7.9	0.9	FAIL
5	14.1	0.9	FAIL
25	27.3	0.9	FAIL
50	33.1	0.9	FAIL
100	39.8	0.9	FAIL
200	48.2	0.9	FAIL

Structure 1 of 1

Material: Combination
Physical Barrier (s)/Severity: Debris/ Sediment/Rock; Free Fall, Severe

Slope Matches Stream (%): No data
Structure Comments: Inlet totally clogged
Outlet Armoring: Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Box/Bridge with Abutments, Headwall
Inlet Drop/Grade: Clogged/Collapsed/ Submerged
Width: 5.0, Height: 0.5
Substrate/Water Width: 5.00

Outlet

Outlet Shape:
Outlet Drop/Grade: Clogged/Collapsed/ Submerged
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 4.0, Height: 4.0
Substrate/Water Width: 3.60
Water Depth: 1.50

Road: Railroad **Stream:** Unknown

Location
Coordinates: 42.17355, -73.86663
Location Description: Rail rd
Date Observed: 10/23/2017
Survey ID: 55648

Road
Road Type/Surface: Railroad
Road Fill Height (feet): 8.00
Road Ownership: Railroad

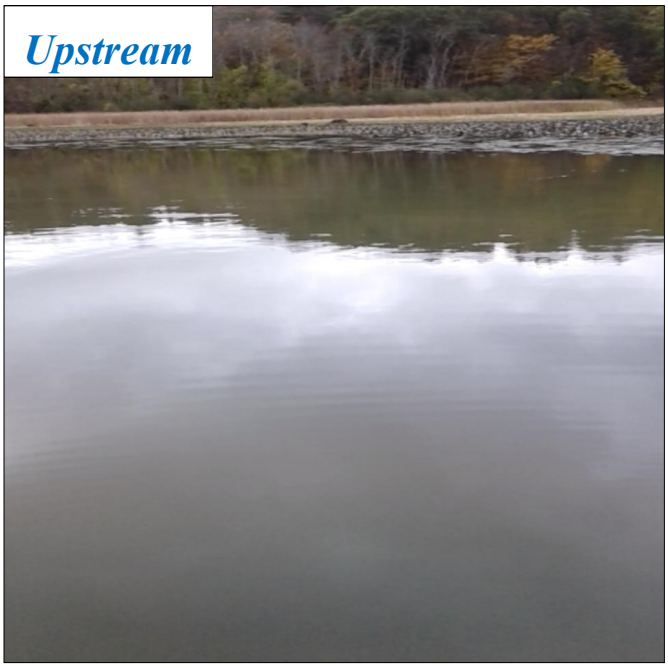
Results
Barrier Evaluation: no score - missing data
Aquatic Organism Passage Score: No AOP
Condition/Maintenance: Poor
Max Return Interval: 5

Stream and Crossing

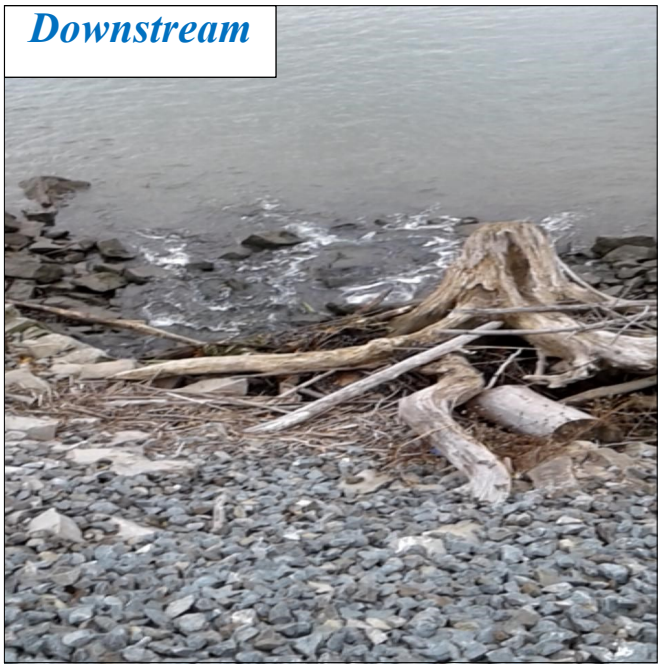
Crossing Characteristics
Crossing Type: Culvert
Length: 52.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: Unknown/Unknown
Substrate Matches Stream: Unknown
Substrate Type: Unknown
Substrate Coverage: Unknown

Upstream



Downstream



Crossing Comments: Outlet clogged colapsed

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	2.0	6.0	PASS
5	4.4	6.0	PASS
25	10.1	6.0	FAIL
50	12.6	6.0	FAIL
100	15.4	6.0	FAIL
200	18.9	6.0	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: Debris/ Sediment/Rock; Deformation, Severe

Slope Matches Stream (%): No data
Structure Comments: Outlet collapsed
Outlet Armoring: Not Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 4.0, Height: 4.0
Substrate/Water Width: 3.50
Water Depth: 1.80

Outlet

Outlet Shape:
Outlet Drop/Grade: Clogged/Collapsed/ Submerged
Drop to Stream Surface/Bottom: 1.50/3.00
Width: 1.5, Height: 1.0
Substrate/Water Width: 1.50
Water Depth: No data

Additional Photos

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For additional data, see Appendix

Road: Railroad **Stream:** Unknown

Location
Coordinates: 42.17100, -73.87077
Location Description: Rail rd
Date Observed: 10/23/2017
Survey ID: 55651

Road
Road Type/Surface: Railroad
Road Fill Height (feet): 5.00
Road Ownership: Railroad

Results
Barrier Evaluation: Minor barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: OK
Max Return Interval: 0

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 50.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: No-Shallower/No-Faster
Substrate Matches Stream: Comparable
Substrate Type: Silt
Substrate Coverage: 100%

Upstream

Downstream

Crossing Comments: Beaver dam directly upstream

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	16.0	7.3	FAIL
5	31.8	7.3	FAIL
25	68.2	7.3	FAIL
50	84.9	7.3	FAIL
100	103.5	7.3	FAIL
200	126.8	7.3	FAIL

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: Debris/ Sediment/Rock, Minor

Slope Matches Stream (%): No data
Structure Comments: Beaver sticks in culvert

Inlet

Inlet Shape/Type: Pipe Arch/Elliptical Culvert, None
Inlet Drop/Grade: At Stream Grade
Width: 5.5, Height: 5.3
Substrate/Water Width: 5.40
Water Depth: 0.50

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/1.20
Width: 5.5, Height: 6.0
Substrate/Water Width: 5.50
Water Depth: 1.20

Additional Photos

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Road: Railroad Stream: Unknown

Location
Coordinates: 42.16069, -73.88365
Location Description: Germantown bay
Date Observed: 10/23/2017
Survey ID: 55655

Road
Road Type/Surface: Railroad
Road Fill Height (feet): 0.50
Road Ownership: Railroad

Results
Barrier Evaluation: Insignificant barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: Poor
Max Return Interval: No data

Stream and Crossing

Crossing Characteristics
Crossing Type: Bridge
Length: 40.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: No

Stream Characteristics
Scour Pool: Small
Water Depth/Velocity Matches Stream: Unknown/Unknown
Substrate Matches Stream: Contrasting
Substrate Type: Gravel
Substrate Coverage: 100%

Upstream

Downstream

Crossing Comments: Crossing drains tidal bay

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	No data	No data	No data
5	No data	No data	No data
25	No data	No data	No data
50	No data	No data	No data
100	No data	No data	No data
200	No data	No data	No data

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: Debris/ Sediment/Rock, Minor

Slope Matches Stream (%): No data
Structure Comments: Out going tide
Outlet Armoring: Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Box/Bridge with Abut-ments, Headwall
Inlet Drop/Grade: At Stream Grade
Width: 9.5, Height: 7.5
Substrate/Water Width: 9.50
Water Depth: 1.10

Outlet

Outlet Shape:
Outlet Drop/Grade: At Stream Grade
Drop to Stream Surface/Bottom: 0.00/0.00
Width: 9.5, Height: 7.5
Substrate/Water Width: 9.50
Water Depth: 1.20

Additional Photos

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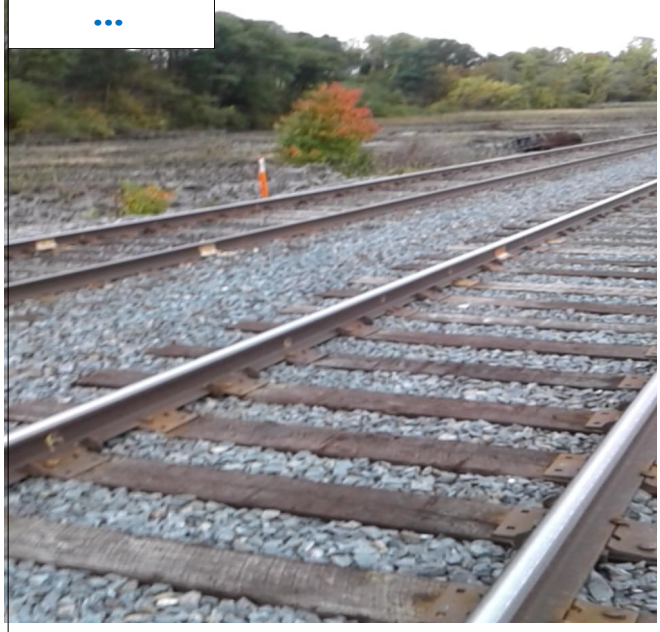

Road: Railroad **Stream:** Unknown

Location
Coordinates: 42.17103, -73.87082
Location Description: Rail rd
Date Observed: 10/23/2017
Survey ID: 55657

Road
Road Type/Surface: Railroad
Road Fill Height (feet): 6.00
Road Ownership: Railroad

Results
Barrier Evaluation: Severe barrier
Aquatic Organism Passage Score: Reduced AOP
Condition/Maintenance: Poor
Max Return Interval: No data

Stream and Crossing

Crossing Characteristics
Crossing Type: Culvert
Length: 45.00
Number of structures/cells: 1
Alignment: Flow-Aligned
Dry Passage/Height: Yes

Stream Characteristics
Scour Pool: Large
Water Depth/Velocity Matches Stream: Dry/Dry
Substrate Matches Stream: None
Substrate Type: None
Substrate Coverage: None

Upstream

Downstream

Crossing Comments: No flow at low tide

Return Interval (Years)	Peak Flow (cfs)	Culvert Capacity (cfs)	Pass/Fail
2	No data	No data	No data
5	No data	No data	No data
25	No data	No data	No data
50	No data	No data	No data
100	No data	No data	No data
200	No data	No data	No data

Structure 1 of 1

Material: Concrete
Physical Barrier (s)/Severity: Debris/ Sediment/Rock, Moderate

Slope Matches Stream (%): No data
Structure Comments: Low tide
Outlet Armoring: Not Extensive

Inlet

Outlet

Inlet

Inlet Shape/Type: Round Culvert, None
Inlet Drop/Grade: Perched
Width: 4.0, Height: 4.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Outlet

Outlet Shape:
Outlet Drop/Grade: Free Fall
Drop to Stream Surface/Bottom: 0.50/1.20
Width: 4.0, Height: 4.0
Substrate/Water Width: 0.00
Water Depth: 0.00

Additional Photos

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Appendices