





Stormwater Asset Management Plan

Town of Southampton, MA

August 2025

Tighe&Bond

MASSACHUSETTS CLEAN WATER TRUST

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Section 1 Introduction

The Town of Southampton recognizes the potential impacts from climate change and a wide range of natural hazards presenting certain risks to life and property in the Town. As identified in Southampton's 2021 Municipal Vulnerabilities Preparedness (MVP) Plan, major storm events have been a recurring threat to Southampton throughout its history, from hurricanes like the Great Hurricane of 1938 and other storms bringing wind, intense precipitation, and localized flooding, to winter storms or nor'easters delivering ice and snow. More recently, the Town has been experiencing an increasing regularity of storms, with the 100-year storm designation occurring more frequently. More intense storms delivering higher volumes of precipitation in a single event are expected to put significant pressure on dams, culverts, and other drainage infrastructure that were designed to handle smaller storms with more consistent distributions of precipitation.

In Southampton, like in many communities across the Commonwealth, existing culverts and bridges were designed to accommodate historic patterns of precipitation and runoff. As precipitation events become more intense and less predictable, undersized culverts are expected to pose a greater threat of failure and flooding. The Town recognizes that these culverts should be managed to benefit residents and local businesses. However, culverts are typically only repaired and replaced as problems arise, and a more reactive approach has been taken in maintaining them. The Town's understanding of their condition was limited. Therefore, Southampton staff identified development of a Stormwater Asset Management Plan (AMP) as a priority to help prioritize and improve overall stormwater management, and establish a proactive stormwater system maintenance, repair, and replacement program.

A Massachusetts Department of Environmental Protection (MassDEP) AMP Grant application was submitted by the Town in August 2022 to establish an asset management program for the Town's culverts. In April 2023, MassDEP notified that the Town qualified for the AMP Grant on the Massachusetts Clean Water State Revolving Fund's (CWSRF) Final Intended Use Plan (IUP) and was issued a Notice to Proceed. This grant reimburses 60% of the cost associated with development of an AMP.

The Town's objectives for the AMP project were as follows:

- Develop an inventory and a better understanding of existing culverts.
- Create a risk-based AMP and capital improvement planning methodology that will support decision makers and be available for public presentation.
- Develop a program that emphasizes proactive measures to improve existing maintenance practices to avoid systems reaching failure.
- Define a desired level of service, developing a map in GIS, determining the condition of culverts, and developing a prioritized primary and secondary list of culverts.
- Obtain conceptual Opinion of Probable Construction Costs (OPCC) for repair or replacement of up to five (5) structures as needed to program capital requirements.
- Create an electronic process for tracking Town procedures associated with documenting culvert operations and maintenance.

1.1. Overview of Asset Management Principles

Utilities that use asset management planning as a tool to help them in the economic delivery of services find it beneficial in terms of maximizing the value of assets. Asset management includes the planning, design, construction, operation, maintenance, rehabilitation, and replacement of infrastructure that performs a function for the Town in a cost-effective manner. There are numerous benefits of asset management that include, but are not limited to:

> The EPA defines asset management as "*maintaining a desired level of service for what you want your assets to provide at the lowest life cycle cost. Lowest life cycle cost refers to the best appropriate cost for rehabilitating, repairing or replacing an asset.*" [1]

- Understanding the Town's stormwater system assets, desired level of services, and costs associated with operation and maintenance;
- Communicating with transparency, justifying investments to the community, and demonstrating a responsible investment in infrastructure;
- Budgeting based on improved understanding about the timing and expense of rehabilitation, repair, and/or replacement needs;
- Prolonging asset life;
- Meeting level of service expectations;
- Addressing regulatory requirements;
- Improving responses to emergencies;
- Providing methodologies for determining replacement of existing equipment prior to failure;
- Providing Town staff with the necessary tools by acquiring equipment for recording and transfer to new or existing software systems;
- Outlining predetermined schedules for equipment replacement prior to failure; and
- Identifying annual budget line-item costs for implementation of Asset Management Plans.

[1] EPA, "Asset Management: A Best Practices Guide," April 2008.
URL: https://nepis.epa.gov/Exe/ZyPdf.cgi?Dockey=P1000LP0.txt

The general process of asset management is shown in **Figure 1-1** and involves defining the following items:

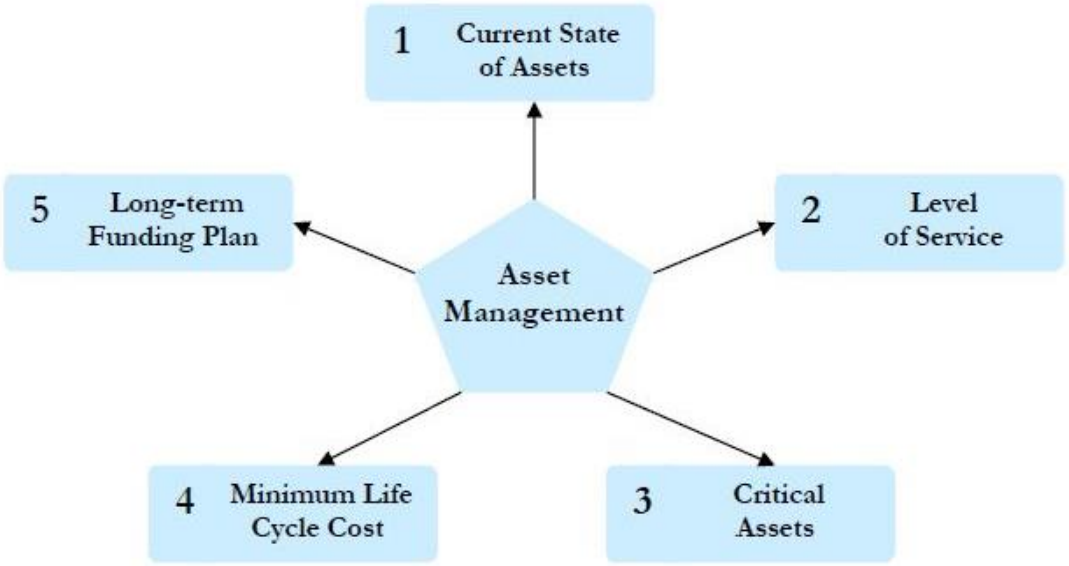


Figure 1-1 The Five Core Questions for Implementing Asset Management [1]

1. **Current State of Assets**: Inventory the available assets throughout the stormwater system. The inventory list consists of asset location, condition, maintenance history, service life, and value, if possible.

2. **Level of Service**: Determine a system operation that is sustainable by considering water quality, water quantity, system reliability, regulatory requirements, and environmental standards.

3. **Critical Assets**: Assign criticality scores to the assets required for continued sustainable system operation. An asset's risk of failing due to their condition, consequences in the event of failure, and cost of repair or replacement in the event of failure may dictate the criticality score.

4. **Minimum Life Cycle Cost**: Analyze existing O&M procedures and activities to determine how they may be optimized based on cost, criticality, and level of service.

5. **Long-Term Funding Plan**: Establish the financial capital necessary to maintain a desired level of service by proactively evaluating rate structure and available funding opportunities.

Often communities conduct O&M activities on a reactive basis, with resources allocated to emergency response and rehabilitation or replacement of failed assets. This is classified as a Run-to-Failure Management Model, as shown in **Figure 1-2**. Under this model, assets that have not yet failed are aging, defects are worsening, and future problems are developing. Ultimately, this can lead to higher and unanticipated costs for maintenance and replacement or repair.

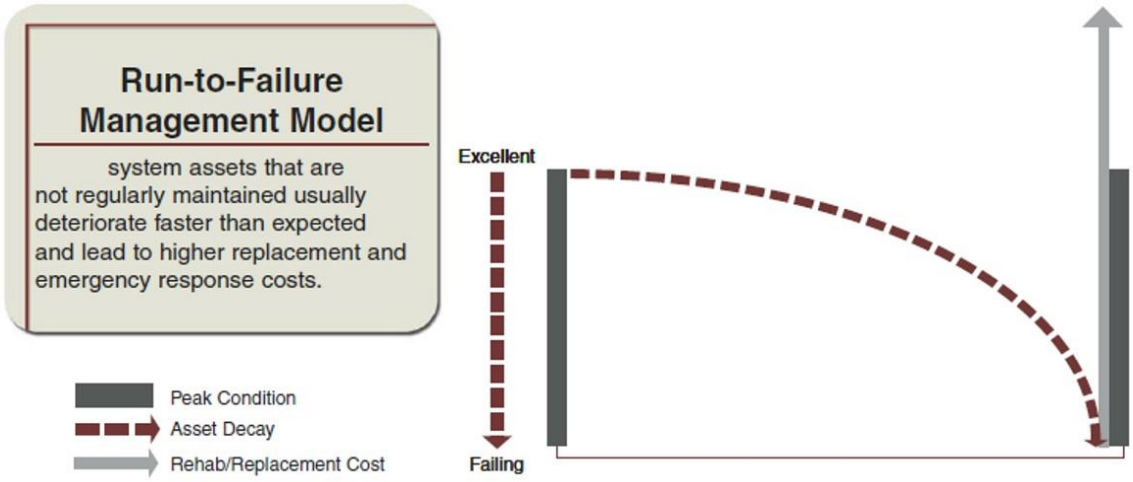


Figure 1-2 Run-to-Failure Management Model [2]

Alternatively, utilizing an asset management approach, as shown in **Figure 1-3**, allows aging infrastructure to be maintained and replaced prior to failure. This prevents adverse consequences of failure and distributes costs over the service life of the asset.

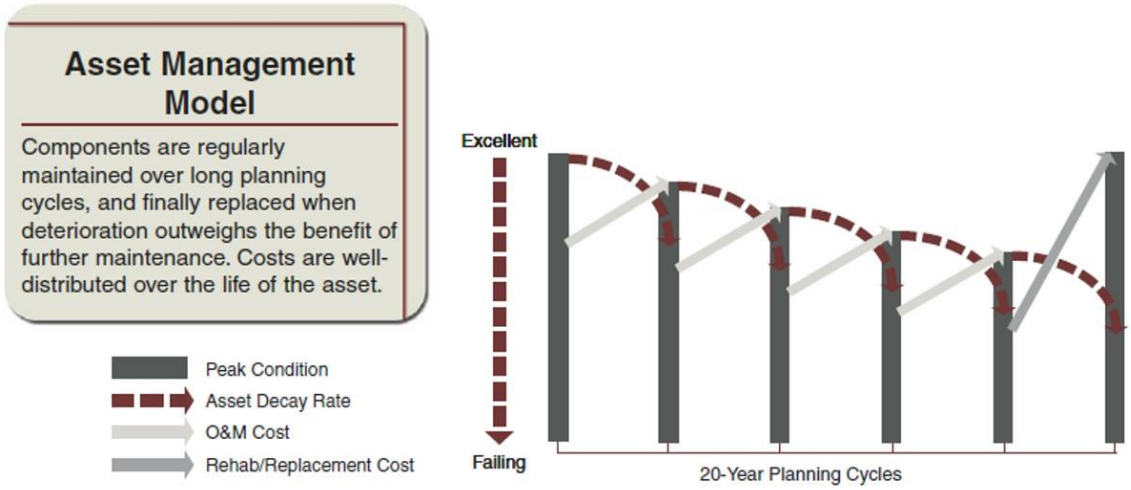


Figure 1-3 Asset Management Model [2]

[2] EPA, "Fact Sheet: Asset Management for Sewer Collection Systems," April 2002. URL: https://www3.epa.gov/npdes/pubs/assetmanagement.pdf

1.2. Development of the Asset Management Program

Tighe & Bond worked with the Town of Southampton staff to develop this stormwater AMP to provide the Town with its desired programmatic and level of service goals. The plan was developed through the following major steps, which are described in detail in subsequent sections.

1. Develop AMP and Level of Service goals (Section 1.2.1);
2. Develop an initial inventory of all culverts in Southampton (Section 2);
3. Conduct field work to assess culvert conditions and improve initial culvert inventory (Section 3);
4. Determine a risk-based prioritization for culvert repairs and replacement (Section 4); and
5. Develop a written AMP that includes:
    - A description of the culvert inventories and condition assessment results (Sections 2 and 3);
    - The risk-based prioritization process (Section 4);
    - Recommendations for capital improvements, further investigation, maintenance, and programmatic improvements;
    - Funding considerations (Section 6); and
    - Plan for permitting culvert replacements (Section 7).

1.2.1. Level of Service Workshop

Tighe & Bond and Town staff held a Level of Service Workshop on March 13, 2024 to review and discuss the goals and objectives of the AMP. Representatives from multiple Town departments, including Highway, Select Board, and Town Administrator, provided input on the AMP program goals and potential challenges, level of service goals, consequence of failure considerations, and critical or at-risk areas in Southampton where failure of the drainage system would lead to significant negative impact.

1.2.2. Public Education and Outreach

Public education materials were prepared for the general public to provide awareness of ongoing field work. A post was made to the Town's social media on March 20, 2024 highlighting the work as part of the development of the Stormwater Asset Management Plan.

1.2.3. Asset Inventory Development, Software, and Training

Prior to the start of the field investigations, Tighe & Bond developed an initial culvert inventory and a digital field form to collect data on culvert characteristics, condition, illicit discharge concerns, maintenance needs, and more. The inventory was created in ESRI's ArcGIS Online (GIS) platform, and the field assessment form was created in Survey123 and has been linked to the respective culvert in the ArcGIS platform. This software was used throughout the AMP, as described in Sections 2 and 3, and the Town should continue to use it moving forward for implementation of the AMP.

Section 2 Culvert Asset Inventory

Tighe & Bond performed a desktop analysis to identify locations of potential stream crossings (i.e., locations that were likely to have a culvert under a roadway to connect mapped waterways and wetlands). This effort identified 78 potential Town-owned culvert locations. As culvert assessment field work was completed (see Section 3), Tighe & Bond identified 83 additional crossings to add to the inventory and 48 to remove from the inventory (7 culverts found to not exist, 22 redesignated as bridges, 15 found to be privately-owned, 4 found to be state-owned).

This Section presents an overview of the culvert inventory; complete inventory data is included in the Town's GIS database. Note that there are additional private and State-owned culverts in the Town's GIS that are not summarized in this AMP.

Table 2-1 summarizes the number and types of crossings in the Town's GIS database as of the date of this report, including both bridges and culverts, as well as the associated ownership status. Appendix A includes a Town-wide map showing culvert locations by type and ownership. The notes associated with **Table 2-1** explain which structures were assessed in the field. As further described in Section 2.1, bridges categorized as a "National Bridge Inventory" structure have spans greater than 20 feet. Bridges categorized as a "short span" have a span between 10 and 20 feet.

Table 2-1 Crossing Inventory Summary

Category	Type	Owner	Number of Locations
Bridge [1]	National Bridge Inventory (NBI)	MassDOT	2
		Town [3]	14
		Other [4]	1
	Short Span Bridge	Town [5]	5
Culvert [2]		MassDOT	4
		Town	113
		Private [6]	15
		Total	**154**

Notes:

1. Crossings that were identified as bridges during the preliminary culvert inventory effort were excluded from condition assessment.
2. Culverts include single barrel and multiple barrels.
3. Two of these bridges were identified as culverts in the initial inventory but were determined to meet the definition of a bridge during field work. See Section 2.1 for additional information.
4. One of these crossings, Glendale-1, is located on the town line between Southampton and Easthampton. This crossing is identified as a Bridge (NBI) in MassDOT's bridge inventory and owned by Easthampton. It is shown here for inclusive purposes only and is excluded from this condition assessment.
5. One of these crossings, Fomer-3, is a reservoir's dam that is privately managed. It is shown here for inclusive purposes only and is excluded from this condition assessment.
6. Private crossings may include culverts under driveways, on private property, or under roadways that are not accepted by the Town. Private culverts were excluded from this condition assessment.

2.1. Culverts that Meet the Definition of a Bridge

Tighe & Bond identified crossings that should be considered short span bridges or bridges following the methods defined by the Commonwealth of Massachusetts:[3]

- A short span bridge is a highway bridge structure that meets the Massachusetts General Laws (MGL), which recognize structures having a span greater than 10 feet as bridges, but not the federal definition of a bridge, which defines a bridge as a structure having a span greater than 20 feet. Thus, a short span bridge has a span greater than or equal to 10 feet but less than 20 feet.
- Federal regulations define a bridge as a structure having a span greater than or equal to 20 feet.
- The "span" is the distance between centerlines of bearings.
- The bridge must be on and carry a public way.

Based on these definitions, **Table 2-2** includes three (3) crossings owned by the Town that are considered bridges but are not included in the MassDOT database. While all crossings were visited during field efforts and photo documentation provided to the Town, these bridges were not fully assessed nor presented in this culvert AMP. It is recommended the Town provide these locations and any relevant data to MassDOT so they can be added to the State's inventory and perhaps their routine inspection program.

Table 2-2 Crossing Inventory Summary

Crossing ID	Address	On a Public Way?	Notes
Brittney-1	Brittney Ln	Yes	Bridge: Span 85' [1]
Railroad-1	Manhan Rail Trail	Yes	Bridge
Railroad-3	Manhan Rail Trail	Yes	Bridge

1. Span noted is field measured and rounded to the nearest foot. See Section 5.5.2 for recommendations related to bridges.

2.2. Multi-barrel Culverts

During the field inventory, five (5) of the Town's culverts were identified to contain multiple barrels. Each culvert barrel was evaluated and surveyed in GIS under the same culvert ID. Per the assessment and ranking protocols followed (see Sections 3 and 4), the criticality score of the barrel in the worst condition was assigned to the entire culvert. Multi-barrel culverts are listed in **Table 2-3**.

Table 2-3 Summary of Culverts with Multiple Barrels

Culvert ID	Address	Number of Barrels
Cook-1	Cook Rd	2
Cottage-1	Cottage Ave	2
Delisle-1	Delisle Rd	2
Douglas-1	Douglas Rd	2
Line-1	Line St	2

[3] Determining if a structure is a "BRI", MassDOT. URL: https://www.mass.gov/service-details/determining-if-a-structure-is-a-bri

2.3. Culverts Determined to be Privately-Owned

During the assessment work, it was determined that fifteen (15) culverts in the initial prioritized culvert list were privately-owned. Private culverts are listed in **Table 2-4**.

Table 2-4 Summary of Private Culverts

Culvert ID	Address
Clark-1	Clark St
CrookedLedge-2	Crooked Ledge Rd
CookedLedge-5	Crooked Ledge Rd
Eastwood-1	Off Eastwood Dr
Edwards-1	Edwards Rd
Edwards-2	Edwards Rd
Fomer-7	Fomer Rd
Fomer-8	Fomer Rd

Culvert ID	Address
Fomer-9	Fomer Rd
Fomer-10	Fomer Rd
Manhan-1	Manhan Rd
Middle-4	Middle Rd
PomeroyMeadow-3	Off Pomeroy Meadow Rd
Russellville-4	Russellville Rd
Wolcott-1	Wolcott Rd

These culverts were not assessed during the effort and are noted as Private in the GIS inventory.

2.4. Age of Assets

Implementing an asset management program requires knowledge about the age of infrastructure. Currently, the GIS contains limited information on the year of installation for different drainage assets. This information should be populated as available for existing drain structures, drain pipes, and culverts to better understand the age and remaining service life of the drainage system.

For comprehensive asset management, it is also important to understand the typical service life of an asset. The expected service life for different asset types typical to Southampton's stormwater system (e.g., gravity drain pipes, culverts, catch basin laterals, drain manholes, catch basins, outfalls, and infiltration and detention basins) ranges from 50 to 100 years depending on the material type and asset use. For example, corrugated metal pipes (CMP) typically have a shorter service life than reinforced concrete pipes.

Southampton's infrastructure will also have longer or shorter service lives depending on the original quality of the infrastructure and installation, the specific environment and conditions, and operation and maintenance throughout the asset's service life. For example, some assets, such as reinforced concrete culverts, are assumed to have a service life of 100 years, but if a 95-year-old pipe is assessed and found to be in excellent condition, the service life could be adjusted accordingly.

Since there is limited data related to date installed or asset age within the Town's GIS inventory, more meaningful age information needs to be obtained to truly assess the remaining service life of individual assets within Southampton's drainage system.

Section 3 Culvert Assessment Field Work

As stated by the Nature Conservancy, North Atlantic Aquatic Connectivity Collaborative (NAACC), "**crossing failures during extreme storms and flooding events can impede critical routes and severely disrupt the ability of communities to provide critical emergency services**."[4] Condition assessments were focused on culverts since they are generally considered to have the highest consequence of failure for drainage infrastructure. Tighe & Bond completed visual assessments to collect inventory data and to evaluate existing conditions. This Section describes the process, procedures, and results of these assessments.

3.1. Assessment Protocol

Tighe & Bond developed a culvert assessment protocol and field form to be used during field assessments. The assessment information was developed using Tighe & Bond's experience with culvert assessments and the following resources:

- *Culvert Condition Assessment Manual* and *Culvert Assessment Form,* developed by UMass Transportation Center, NAACC, and the Center for Agriculture, Food, and the Environment, 2019
- *NAACC Stream Crossing Instruction Manual for Aquatic Passability Assessments in Non-tidal Stream and Rivers* and *Aquatic Connectivity Stream Crossing Survey Data Form,* developed by NAACC and UMass Amherst, November 2019

NAACC is a "*network of individuals from agencies and organizations focused on improving aquatic connectivity across a thirteen-state region. The NAACC provides protocols for road-stream crossings (culverts and bridges) to assess and score crossings for fish and wildlife passability, as well as culvert condition and other data useful for evaluating risk of failure*."[5]

Appendix B includes the protocol with a paper version of the field form. Many of the terms used in this discussion of culvert condition are described in this protocol. As discussed in Section 1.2.3, Tighe & Bond created an electronic version of the field form in Survey123. Tighe & Bond staff utilized this field form to collect inventory information and assess culvert condition. This application also allows photos of the culvert's condition to be stored in the form and linked to its location in GIS. Data collected during assessment includes, but is not limited to the following fields:

- Date and time of assessment;
- Weather conditions;
- Observer;
- Identification number of culvert;
- General roadway, guardrail, sidewalk, curbing observations;

[4] North Atlantic Aquatic Connectivity Collaborative,
URL: https://streamcontinuity.org/naacc/assessments/criticality
[5] NAACC Data Center. URL: https://naacc.org/naacc_data_center_home.cfm

- General upstream and downstream conditions and bankfull widths;
- Dimensions at the inlet and outlet;
- Structural conditions at the inlet and outlet (crushing, alignment, invert deterioration, etc.);
- Aquatic passability conditions (constriction, outlet drop, water velocity, etc.);
- Operation and maintenance concerns (sediment in culvert, presence of trees or beaver dams, etc.);
- Photos; and
- Additional notes.

3.2. Culvert Assessment Field Work

Over the course of 18 days between March 2024 and August 2024, Tighe & Bond and Town staff completed assessments of 113 Town-owned culverts to collect the inventory and condition information to be used in the risk-based prioritization. Of the 113 culverts, 6 were found to be partially or completely submerged (see Section 3.3.3). In addition to the 113 confirmed culverts, 3 were re-categorized as bridges due to their spans (see Section 2.1) and 5 were found to be multi-barrel culverts (see Section 2.2).

Appendix C includes summary sheets of the culvert assessments completed. The appendix is presented in numerical order by Culvert ID. Each summary sheet presents key statistics about the roadway, upstream of the culvert, the culvert inlet and outlet, and downstream of the culvert, as well as relevant photos from the assessment. Multi-barrel culverts have multiple pages of information.

3.2.1. Follow-Up Assessments

On October 15, 2024, Tighe & Bond revisited high priority culverts that were deemed to have capacity, habitat, structural, or other issues during the initial assessments. Culverts revisited included those considered high priority in the drafted criticality assessment as well as culverts that were initially found to be partially or fully submerged and could not be fully assessed.

The culverts were revisited at a time of year that typically has relatively low stream levels. Water levels had decreased at many locations, so additional information was collected. Condition information presented in Section 3.3 and the criticality assessment discussed in Section 4 are inclusive of the extra field day's data. The data obtained from the follow-up assessments provided a clearer understanding of the condition of some of the Town's culverts and aided in the final prioritization of culverts for maintenance, repair, and/or replacement.

3.3. Condition of Assessed Culverts

Upstream and downstream information was collected during the condition assessment, including approximate bankfull width. When available, bankfull width was also verified using a desktop assessment in StreamStats, a map-based web application from the U.S. Geological Survey (USGS) that can be used to delineate drainage areas, get basin characteristics, and estimate flow statistics. The inlet and outlet of the structure was assessed with respect to structural deficiencies (such as corrosion, deformation of structure, and condition of joints and seams) and hydraulic deficiencies (such as inlet and

outlet elevation and scour) in accordance with the NAACC protocol, as well as operation and maintenance needs.

For the structural condition criteria, 90% of the fully assessed culverts were found to be in adequate condition in terms of cross-section deformation, with 10% assessed to have deformation rated as poor or critical. 87% of the culverts were found to have adequate joints and seams, 7% had poor joints and seams, and 6% had critical joints and seams. 75% of the assessed culverts had adequate structural integrity, with 25% poor or critical. This information was considered as part of the risk-based prioritization of culvert repairs and replacement, as discussed in Section 5.

Approximately 60% of the Town's culverts are noted to be corrugated metal pipes. Corrugated metal pipes (CMP) are known to have a short service life, which is often made shorter due to New England deicing practices. Of the 113 culverts assessed, 38 were small diameter (up to 24-inches) CMP that will require a more aggressive monitoring of the culvert condition in terms of deterioration and blockages. 14 of the assessed culverts were larger diameter (24 to 36-inches) corrugated metal pipes and 10 were greater than 36-inches in diameter. Over one-half of the assessed CMP culverts have some level of invert deterioration. CMP culverts tend to be identified as a higher priority in the criticality assessment when compared to other culvert materials due to their higher likelihood of failure.



Figure 3-1 Example of severe invert deterioration in a CMP culvert (Whiteloaf-3)

3.3.1. Material Changes

Three (3) culverts assessed change material between the inlets and outlets of the culverts, as follows:

- Brickyard-1 has CMP inlets and HDPE outlet.
- Riverdale-2 and Cook-1 have an HDPE pipe inlet and a CMP outlet.

Culverts that change material throughout its length pose additional challenges to its structural integrity. In particular, joints where the material changes should be monitored more thoroughly for separation, gaps, and root and sediment intrusion. This may require CCTV or other means to access the middle of the culvert span, since the condition of the inlet and outlet may not be representative of the mid-section condition.

3.3.2. Operation and Maintenance Observations

During assessments, O&M concerns were noted, such as tree growth, obstructions, excess trash, bulk dumping/yard waste, and nearby beaver dams. Obstructions included items such as debris, stones, logs, trees, leaves, vegetation that partially or fully block flow through the culvert and reduce the structure's hydraulic capacity. Some culverts were noted as having material or substrate present in the culvert (e.g., rock, gravel, sand) that can reduce the culvert capacity. This section summarizes these issues.

Beaver dams were observed near the inlet of three (3) culverts, as listed in **Table 3-1**. It should also be noted that some culverts had beaver deceivers installed at the inlet. While these were not included as obstructions in **Table 3-7**, if sediment or debris builds up on the deceiver, it can cause a hydraulic restriction. Beaver deceivers should be regularly maintained to prevent this issue.

Table 3-1 Summary of Culverts with Beaver Dams

Culvert ID	Address	Dam Location	Notes
Delisle-1	Delisle Rd	Inlet	100' away
Gilbert-1	Gilbert Rd	Inlet	80' away
Railroad-4	Manhan Rail Trail	Inlet	5' away

Of the assessed culverts, 33 had a **tree present** near the upstream and/or downstream headwall/wingwall. Trees and their roots, if too close to culverts, can cause damage to the headwall/wingwalls and culverts and these culverts should be further assessed, monitored, and trees removed when needed to prevent future damage. A summary of culverts with nearby trees is provided in **Table 3-2**.

Table 3-2 Summary of Culverts with Trees near Headwalls/Wingwalls

Culvert ID	Address	Tree Location
Brickyard-2	Brickyard Rd	Downstream
Clark-2	Clark St	Upstream & Downstream
ColdSpring-1	Cold Spring Rd	Downstream
ColdSpring-2	Cold Spring Rd	Upstream
Coleman-3	Coleman Rd	Upstream
County-1	County Rd	Upstream
East-2	East St	Downstream
East-4	East St	Upstream
Fomer-2	Fomer Rd	Upstream & Downstream
Fomer-17	Fomer Rd	Downstream
Fomer-23	Fomer Rd.	Downstream
Gilbert-2	Gilbert Rd	Downstream
High-1	High St	Downstream
High-5	High St	Downstream
Pequot-1	Pequot Rd	Upstream
Pleasant-2	Pleasant St	Downstream
Pleasant-9	Pleasant St	Downstream
Pleasant-11	Pleasant St	Downstream
Pomeroy Meadow-4	Pomeroy Meadow Rd	Downstream
Railroad-1	Manhan Rail Trail	Upstream & Downstream
Railroad-2	Manhan Rail Trail	Upstream
Railroad-3	Manhan Rail Trail	Upstream & Downstream
Railroad-5	Manhan Rail Trail	Upstream
Railroad-6	Manhan Rail Trail	Downstream
Railroad-7	Manhan Rail Trail	Upstream
Railroad-9	Manhan Rail Trail	Upstream & Downstream
Railroad-13	Manhan Rail Trail	Upstream & Downstream
Russellville-1	Russellville Rd	Upstream
Strong-1	Strong Rd	Downstream
TownHall-1	210 College Hwy	Downstream
Whiteloaf-1	White Loaf Rd	Downstream
Whiteloaf-3	White Loaf Rd	Upstream & Downstream
Wolcott-3	Wolcott Rd	Downstream

Poor or critical **roadway embankment conditions** were noted at 37 upstream locations and 28 downstream locations. Poor roadway embankment conditions show severely undermined embankment protection (significant erosion of the embankment) and should be repaired as soon as possible. Critical roadway embankments noted have severe scour of the embankment and threaten the stability of the roadway, as shown in **Figure 3-2**. These should be addressed immediately. Of the 37 upstream locations, 10 are noted as critical. Of the 28 downstream locations, 10 are critical. The culverts identified as having critical embankment(s) are included in **Table 3-3**.

Table 3-3 Summary of Culverts with Critical Roadway Embankments

Culvert ID	Address	Location
Brickyard-1	Brickyard Rd	Upstream
Brickyard-2	Brickyard Rd	Upstream
Brickyard-3	Brickyard Rd	Upstream
Coleman-2	Coleman Rd	Upstream
Cook-1	Cook Rd	Downstream
CrookedLedge-3	Crooked Ledge Rd	Upstream
Douglas-1	Douglas Rd	Downstream
Fomer-4	Fomer Rd	Downstream
Fomer-5	Fomer Rd	Upstream & Downstream
Gilbert-3	Gilbert Rd	Upstream
RattleHill-1	Rattle Hill Rd	Upstream
Railroad-1	Manhan Rail Trail	Downstream
Railroad-4	Manhan Rail Trail	Upstream & Downstream
Railroad-7	Manhan Rail Trail	Downstream
Railroad-8	Manhan Rail Trail	Upstream
Railroad-10	Manhan Rail Trail	Downstream
TownHall-1	210 College Hwy	Downstream
Whiteloaf-2	White Loaf Rd	Downstream



Figure 3-2 Example of a culvert with a critical roadway embankment (Gilbert-3)

Upstream scour damage was noted if present, as well as the location and severity of the damage. Scour will erode the stream embankment, exposing the culvert structure. Culverts with large scour damage are shown in **Table 3-4**.

Table 3-4 Summary of Culverts with Large Scour Damage

Culvert ID	Address	Location
Fomer-20	Fomer Rd	Culvert
Fomer-21	Fomer Rd	Culvert
Fomer-22	Fomer Rd	Culvert
Middle-6	Middle Rd	Culvert
Railroad-6	Manhan Rail Trail	Culvert
Railroad-8	Manhan Rail Trail	Culvert
Railroad-13	Manhan Rail Trail	Culvert
Whiteloaf-3	White Loaf Rd	Wingwalls
Wolcott-3	Wolcott Rd	Culvert

Note that downstream scour damage was also evaluated and included as part of the criticality assessment described in Section 4.

Bends mid-crossing of the culvert were noted if present, and the severity of the skew if applicable. These bends indicate the alignment of the crossing structure relative to the direction of the crossing inlet. Culverts found to have a bend indicate the culvert changes structural alignment under the roadway, and the greater the angle the more severe the rating. Culverts that have bends pose additional challenges to their structural integrity and should be monitored more aggressively for separation, gaps, and root and sediment intrusion. Culverts with bends are shown in **Table 3-5**.

Table 3-5 Summary of Culverts with Bends Mid-Crossing

Culvert ID	Address	Bend (Degrees)
Brickyard-4	Brickyard Rd	<45
CrookedLedge-6	Crooked Ledge Rd	<45
Fomer-17	Fomer Rd	<45
Fomer-20	Fomer Rd	<45
Maple-4	Maple St	<45
PomeroyMeadow-1	Pomeroy Meadow Rd	<45
PomeroyMeadow-4	Pomeroy Meadow Rd	<45
Railroad-6	Manhan Rail Trail	<45
Riverdale-2	Riverdale Rd	<45
TownHall-1	210 College Hwy	>45
Valley-6	Valley Rd	<45
Whiteloaf-2	White Loaf Rd	<45

The **condition of roadway features** (road, guardrail, sidewalk, curbing) was also collected in the field at each culvert location. Each of these parameters can be used to help inform decisions in situations of rehabilitation or replacement of a culvert. Often culvert defects and structural deficiencies will result in road settlement, pavement cracking, and ultimately failure. Guardrail condition, while not indicative of culvert condition, can be a useful metric to the Town's planning of roadway projects. **Table 3-6** includes a summary of culverts with at least one roadway feature rated in poor or critical condition. Note locations that do not have one of these features (e.g., no guardrail) are noted as N/A.

Table 3-6 Culverts with Poor or Critical Roadway Features

Culvert ID	Address	Road	Sidewalk	Curbing	Guardrail
Brickyard-5	Brickyard Rd	Poor	N/A	N/A	N/A
Clark-2	Clark St	Adequate	N/A	N/A	Poor
Coleman-1	Coleman Rd	Poor	N/A	N/A	N/A
CrookedLedge-1	Crooked Ledge Rd	Critical	N/A	N/A	N/A
CrookedLedge-3	Crooked Ledge Rd	Critical	N/A	N/A	N/A
CrookedLedge-4	Crooked Ledge Rd	Critical	N/A	N/A	N/A
Douglas-1	Douglas Rd	Critical	N/A	N/A	N/A
Douglas-2	Douglas Rd	Poor	N/A	N/A	N/A
East-2	East St	Poor	N/A	N/A	Adequate
East-5	East St	Poor	N/A	N/A	Adequate
Fomer-1	Fomer Rd	Poor	N/A	N/A	N/A

Culvert ID	Address	Road	Sidewalk	Curbing	Guardrail
Fomer-2	Fomer Rd	Adequate	N/A	N/A	Critical
Fomer-4	Fomer Rd	Critical	N/A	N/A	N/A
Fomer-5	Fomer Rd	Critical	N/A	N/A	N/A
Gilbert-1	Gilbert Rd	Adequate	N/A	N/A	Poor
High-2	High St	Poor	N/A	N/A	Adequate
High-3	High St	Poor	N/A	N/A	Adequate
Line-1	Line St	Adequate	Poor	Poor	Adequate
Middle-11	Middle Rd	Poor	N/A	N/A	N/A
Miller-1	Miller Ave	Critical	N/A	N/A	N/A
Railroad-1	Manhan Rail Trail	Poor	N/A	N/A	N/A
Railroad-2	Manhan Rail Trail	Critical	N/A	N/A	N/A
Railroad-4	Manhan Rail Trail	Poor	N/A	N/A	N/A
Railroad-5	Manhan Rail Trail	Poor	N/A	N/A	N/A
Railroad-6	Manhan Rail Trail	Critical	N/A	N/A	N/A
Railroad-7	Manhan Rail Trail	Critical	N/A	N/A	N/A
Railroad-8	Manhan Rail Trail	Critical	N/A	N/A	N/A
Railroad-9	Manhan Rail Trail	Poor	N/A	N/A	N/A
Railroad-10	Manhan Rail Trail	Poor	N/A	N/A	N/A
Railroad-11	Manhan Rail Trail	Poor	N/A	N/A	N/A
Railroad-12	Manhan Rail Trail	Poor	N/A	N/A	N/A
Railroad-13	Manhan Rail Trail	Adequate	N/A	N/A	Critical
Riverdale-2	Riverdale Rd	Poor	N/A	N/A	Adequate
Russellville-6	Russellville Rd	Adequate	N/A	Adequate	Poor
Strong-2	Strong Rd	Poor	N/A	Adequate	Adequate
TownHall-1	210 College Hwy	Critical	N/A	N/A	N/A
Valley-2	Valley Rd	Poor	N/A	N/A	N/A
Valley-5	Valley Rd	Critical	N/A	N/A	N/A
Valley-6	Valley Rd	Poor	N/A	N/A	N/A
Wolcott-2	Wolcott Rd	Poor	N/A	N/A	N/A
Wolcott-3	Wolcott Rd	Poor	N/A	N/A	N/A

Obstructions were observed at the culverts, including items such as wood, sediment, trash, piled vegetation or rocks, and debris. Some of the culverts had severe obstructions that limited the assessment of the barrel's condition. **Figure 3-3** demonstrates the critical obstruction of Cook-1 due to sediment. The obstructions identified in the field are summarized in **Table 3-7**. These culverts should be further investigated and/or addressed as needed, and the condition of the culvert re-evaluated once addressed.



Figure 3-3 Cook-1 Sediment Obstruction

Culverts that were found to be **submerged** for at least one end of the culvert are also included in **Table 3-7**. If water levels do not regularly recede enough to expose the submerged culverts, there may be a hydraulic restriction within the stream branch. The Town could consider completing an additional assessment of hydraulic capacity to confirm whether the culverts are properly sized or if tailwater conditions exist.

Table 3-7 Summary of Culverts that Could Not Be Fully Assessed

Culvert ID	Address	Inlet/Outlet	Reason
Buried/Blocked			
Brickyard-4	Brickyard Rd	Outlet	Sediment blockage
Brickyard-5	Brickyard Rd	Outlet	Sediment blockage
Cook-1	Cook Rd	Inlet & Outlet	Sediment blockage
Cottage-1	Cottage Ave	Inlets	Sediment blockage
CrookedLedge-1	Crooked Ledge Rd	Inlet & Outlet	Inlet mostly buried by sediment. Outlet buried under logs.
Fomer-2	Fomer Rd	Inlet & Outlet	Inlet cannot locate, possibly buried Outlet blocked by large stones
Fomer-5	Fomer Rd	Inlet & Outlet	Sediment and debris blockage
Middle-3	Middle Rd	Inlet	Cannot locate, possibly buried
Railroad-1	Manhan Rail Trail	Outlet	Headwall/embankment collapse
Railroad-4	Manhan Rail Trail	Inlet	Beaver dam logs
Railroad-8	Manhan Rail Trail	Outlet	Sediment buildup, possible collapse
Russellville-6	Russellville Rd	Inlet & Outlet	Inlet is a modified catch basin that allows stream flow to enter the structure. The Outlet is buried in sediment.
Strong-1	Strong Rd	Outlet	Heavy brush, sediment obstruction
Wolcott-3	Wolcott Rd	Inlet & Outlet	Sediment blockage in inlet pipe Sediment obstructing outlet, buried
Submerged			
ColdSpring-2	Cold Spring Rd	Outlet	Submerged
CrookedLedge-3	Crooked Ledge Rd	Inlet & Outlet	Submerged
Gilbert-4	Gilbert Rd	Outlet	Submerged, heavy brush

Culvert ID	Address	Inlet/Outlet	Reason
Pleasant-7	Pleasant St	Outlet	Submerged
Riverdale-2	Riverdale Rd	Outlet	Submerged
Valley-2	Valley Rd	Inlet & Outlet	Submerged, possible sediment obstruction
Inaccessible			
High-4	High St	Inlet	Inlet is a modified catch basin that allows stream flow to enter the structure.
Middle-11	Middle Rd	Outlet	Outlet is a modified catch basin that allows stream flow to exit the structure.

*Note: TownHall-1 was noted as critically obstructed at the Inlet. It is not included in this table as the culvert assessment was completed around the obstruction. It is recommended the obstruction be cleared.

One culvert (Pequot-2) **could not be located**. The site was visited by Tighe & Bond but neither an inlet nor outlet could be located. This culvert should be added to the Town's culvert assessment and maintenance program for additional investigation.

Section 4 Risk-Based Prioritization

4.1. The Case for Asset Management

Historically Southampton has managed its stormwater system by relying on its existing technology and tools, as well as the in-depth system knowledge of long-serving personnel, to plan for capital projects that are judged to be the highest priority. However, priority is often given to immediate problems as they arise. By approaching capital projects in this way, Southampton could be underestimating the urgency of other stormwater system upgrades.

For this reason, a more proactive, data-driven decision-making process would help target stormwater assets that should be prioritized before they run to failure and become an emergency. The current funding prioritization process for maintenance and capital projects does not consider "criticality" of drainage system components. **The relationship between the probability and consequence of failure determines the criticality of an asset**, as demonstrated in **Figure 4-1**. An asset in new condition (low probability of failure) with a low consequence of failure is considered a low-risk asset. Conversely, an asset that is in poor condition (high probability of failure) and has a high consequence of failure is considered a critical asset with a high risk for the Town and should be at the top of the priority list. Adopting an asset management approach for strategic maintenance and risk-based capital improvements will save Southampton time and money in the long term.

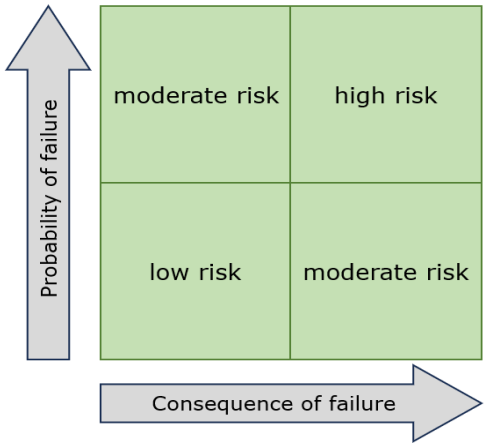


Figure 4-1 Criticality Matrix

4.2. Priority Ranking of Assessed Assets

Tighe & Bond utilized the culvert assessment results as components in assessing criticality. In determining a culvert's criticality, there are two important questions:

1. How likely is the culvert to fail?
2. If the culvert does fail, what will be the consequence?

In the context of asset management, criticality is defined as an asset's probability of failure (PoF) multiplied by the severity and extent of the consequences of that failure (CoF). **Criticality allows the Town to manage its overall risk and provides a logical framework for allocation of operation and maintenance dollars and capital expenditures.**

The likelihood that an infrastructure component will fail is a function of the component's condition, performance, reliability, and maintenance history. Failure refers to the state of

not meeting a desirable or intended objective. There are several modes of failure[6] that may occur, including:

- **Mortality** – The asset stops functioning due to a physical condition or break;
- **Capacity** – The asset is functioning but will not provide the quantity of service required;
- **Level of service** – Changes in needs or in regulations demand a higher level of service than the asset can deliver; and
- **Financial inefficiency** – The asset is costing more to repair than it would to replace.

Tighe & Bond's methodology for determining PoF and CoF and subsequently criticality for Southampton's culverts is described in the following sections. The criticality analysis was completed and ranked using NAACC's probability of failure criteria and Tighe & Bond's customized consequence of failure criteria, as described in the following sections. It should be noted that additional factors such as age could be used in the Town's CoF and PoF analysis, however since Southampton is in the early stages of their asset management program and age data is limited, we used only the data available supplemented with visual assessments completed in the field.

4.3. Probability of Failure (PoF)

The failure of a culvert can be structural or hydraulic in nature. Structural failure could result in a partial or complete roadway collapse, as well as flooding and habitat impacts. Hydraulic failure, when there is partial or complete blockage of the structure, can lead to localized flooding and impacts to abutters or the roadway, or detrimental effects to sensitive habitat and aquatic species. A culvert may also be undersized for current rainfall duration and intensity in combination with hydrological changes due to development and redevelopment in the watershed.

PoF was evaluated for each culvert assessed based on the data collected during condition assessments described in Section 3, as summarized in the following sections. The NAACC culvert condition scoring system discussed was used as the primary PoF rank to determine overall criticality. Additional data collected related to roadway condition and environmental concerns can also be used to help prioritize culvert maintenance, assessment, and rehabilitation needs.

4.3.1. NAACC Culvert Condition PoF

In addition to the *Culvert Condition Assessment Manual* and *Culvert Assessment Form*, NAACC also has a *Culvert Condition Scoring System* that was used to assign a criticality score based on structural data collected in the field. The structural data used in the analysis included:

- Cross-Section Deformation
- Structural Integrity of Barrel
- Footings
- Level of Blockage

[6] Modes of failure adapted from University of Southern Maine. Issue Brief, "Asset Management for Stormwater," April 2014. Available at: http://digitalcommons.usm.maine.edu/cgi/viewcontent.cgi?article=1000&context=sustainable_communities.

- Buoyancy or Crushing
- Invert Deterioration
- Joints and Seams
- Longitudinal Alignment
- Headwall/Wingwalls
- Flared End Section
- Apron/Scour Protection
- Armoring
- Embankment Piping

Appendix D includes the methodology for determining each culvert's PoF. Per the NAACC methodology, if cross-section deformation, structural integrity of barrel, footings, or level of blockage at the inlet and/or outlet were marked as "critical" during the field assessment, the entire culvert was given a score of 0 for a highly critical PoF. The NAACC methodology has additional PoF rankings based on how many other parameters are noted as critical and/or poor, as summarized in Appendix D.[7] As described in the methodology, each culvert was assigned a score for each structural deficiency variable and the minimum score resulting from those is the overall score given for each culvert. The scores ranged from 0 (most critical) to 1 (adequate condition). See Section 4.5 for a visual representation of the range of PoF scores.

Following the NAACC *Culvert Condition Assessment* methodology, forty (40) culverts were scored as critical for PoF, defined as a PoF score greater than or equal to 0 and less than 0.2. **However, not all culverts with a high PoF need replacement within the next 5 years; some may simply need a minor repair or maintenance to extend the service life.**

In addition to NAACC's PoF criteria, Tighe & Bond added the factor of "Assessment Complete" to the criticality analysis. This PoF category allowed us to assign scores to culverts that could not be fully assessed during the fieldwork based on the severity of the obstacle. If both the inlet and the outlet could not be assessed (due to high water or debris obstructions), the culvert was given a score of 0 for a highly critical PoF. If only one side was able to be assessed, the culvert was given a score of 0.15 to still be considered a highly critical PoF (as described in NAAC's methodology, a culvert is considered highly critical when the PoF score is less than 0.2). If the assessment was completed at both the inlet and the outlet, the culvert was given a 1 (adequately assessed).

To further prioritize the culvert needs, Tighe & Bond completed an additional review of the critical PoF culverts and used best professional judgement to sort them into different categories for various levels of recommended action: Further Investigation, Monitoring, Maintenance, Rehabilitation, and Replacement.

Table 4-1 includes a summary of the 51 culverts that scored as critical for PoF. The recommendations for each category are further described in Section 5.

[7] It should be noted that NAACC's scoring system also adds the term "not fully assessed" to the score if any field parameter was marked as "Unknown." Due to many Footings being of unknown condition (e.g., not visible, so unknown if they exist without referring to design plans), Tighe & Bond did not include this term in the culvert scoring.

Table 4-1 Summary of High PoF Culverts Based on NAACC Culvert Scoring

Culvert ID	Location	Criticality Rank	Notes and Recommendations
Replacement			
Gilbert-3	Gilbert Rd	High	CMP; deformed, deteriorating, section loss
Brickyard-1	Brickyard Rd	High	CMP; deteriorating, section loss
Pleasant-8	Pleasant St	High	CMP; deformed, deteriorating, section loss, submerged outlet
ColdSpring-2	Cold Spring Rd	High	CMP; deteriorated flared end sections, pipe deteriorating
Gilbert-4	Gilbert Rd	High	CMP; inlet deteriorating, outlet submerged
Brickyard-2	Brickyard Rd	Medium	CMP; deformed, deteriorating, section loss
Fomer-4	Fomer Rd	Medium	CMP; deformed, inlet headwall failed, deteriorating, section loss
Fomer-5	Fomer Rd	Medium	CMP; crushed
Brickyard-4	Brickyard Rd	Medium	CMP; deteriorating, crushed
Fomer-1	Fomer Rd	Medium	CMP; deteriorating, section loss, outlet headwall failed, crushed pipe
Fomer-23	Fomer Rd	Medium	CMP; deteriorating, section loss, disconnected pipe segment undermining embankment
Russellville-6	Russellville Rd	Medium	CMP; submerged/blocked inlet, outlet not located
Railroad-1	Manhan Rail Trail	Medium	Box culvert with undermined stone abutment walls, eroded mortar, outlet headwall failed, collapsed wingwalls
Douglas-1	Douglas Rd	Medium	CMP; deformed, deteriorating, section loss
Miller-1	Miller Ave	Medium	CMP; failed inlet headwall, deteriorating, section loss, outlet crushed and submerged
Douglas-2	Douglas Rd	Medium	CMP; buried inlet, outlet clogged/collapsed /submerged
Wolcott-3	Wolcott Rd	Medium	CMP; deformed, collapsed, outlet not located
Middle-6	Middle Rd	Medium	CMP; deteriorating, section loss
Gilbert-1	Gilbert Rd	Medium	CMP; deteriorating, section loss
Whiteloaf-3	Whiteloaf Rd	Medium	CMP; deformed, section loss
East-3	East St	Medium	CMP; deteriorating, outlet submerged
Pleasant-7	Pleasant St	Medium	CMP; deteriorating, outlet submerged
Rehabilitation			
Middle-2	Middle Rd	High	CMP; inlet headwall failed, deteriorating, section loss
Pleasant-10	Pleasant St	High	HDPE; deformed with rock intrusion
Strong-2	Strong Rd	High	CMP; deteriorating, failing inlet headwall
Maple-4	Maple St	Medium	CMP; deformed, deteriorating, section loss
Railroad-11	Manhan Rail Trail	Medium	Box culvert collapsed, voids, misplaced stones

Culvert ID	Location	Criticality Rank	Notes and Recommendations
Railroad-5	Manhan Rail Trail	Medium	Box culvert with voids, misplaced stones, mid-culvert possible collapse with large stone blockage
Railroad-10	Manhan Rail Trail	Medium	Box culvert with abutment wall collapse, severe undermining
Railroad-8	Manhan Rail Trail	Medium	Box culvert with voids, misplaced stones, undermined abutment
Coleman-3	Coleman Rd	Medium	CMP; failing headwalls, deteriorating, section loss
Pequot-1	Pequot Rd	Medium	CMP; deteriorating, section loss
Coleman-1	Coleman Rd	Medium	CMP; failed inlet headwall, section loss
Gilbert-2	Gilbert Rd	Medium	CMP; deteriorating
Railroad-6	Manhan Rail Trail	Medium	Box culvert with undermined abutment
Maple-2	Maple St	Medium	CMP; deteriorated flared end, section loss
Strong-1	Strong Rd	Medium	CMP; deteriorating, outlet buried
Middle-11	Middle Rd	Medium	CMP; deteriorating
Pleasant-7	Pleasant St	Medium	CMP; outlet submerged, failing headwall
Maintenance/Further Investigation			
TownHall-1	210 College Hwy	High	RCP; blockage at inlet, disjointed pipe segment at outlet, further investigation required mid-span
Cook-1	Cook Rd	High	HDPE; sediment obstruction throughout
Fomer-2	Fomer Rd	High	Blockage at inlet and outlet, unable to assess culvert
CrookedLedge-3	Crooked Ledge Rd	High	CMP; inlet and outlet submerged
Railroad-4	Manhan Rail Trail	Medium	CMP; blockage at inlet, section loss
CrookedLedge-1	Crooked Ledge Rd	Medium	Blockage at inlet, buried outlet
Brickyard-5	Brickyard Rd	Medium	CMP; crushed, deteriorating, sediment blockage
Cottage-1	Cottage Ave	Medium	CMP; sediment blockage, deformed
Whiteloaf-2	Whiteloaf Rd	Medium	CMP; section loss, outlet submerged, outlet headwall failed
Valley-2	Valley Rd	Medium	Inlet and outlet submerged
Middle-3	Middle Rd	Medium	CMP; inlet not located likely buried, outlet deteriorating
Monitoring			
High-4	High St	Medium	HDPE; inlet blocked causing embankment erosion

4.3.2. NAACC Aquatic Passage

In addition to NAACC's culvert condition assessment, NAACC also has instructions for aquatic passability assessments in non-tidal streams and rivers. PoF was also evaluated for each culvert assessed based on the aquatic data collected during assessments described in Section 3. NAACC's *Aquatic Passability Scoring System* was used to assign a criticality score based on aquatic data collected in the field. The data used in the analysis included:

- Constriction
- Inlet grade
- Internal structures
- Outlet armoring
- Physical barriers
- Scour pool
- Substrate coverage
- Substrate matches stream
- Water depth
- Water velocity
- Outlet drop
- Openness
- Height

Appendix D includes the methodology for determining each culvert's aquatic passability PoF. To numerically evaluate each assessed culvert's aquatic passability, we used NAACC's scoring system that uses an algorithm to compute a score, ranging from 0 (reduced passage) to 1 (full passage). The scoring system is not particular to any taxonomic or functional group but instead seeks to evaluate passability for the full range of aquatic organisms likely to be found in rivers and streams.

Table 4-2 highlights the culverts with the lowest score for aquatic passability deficiencies. The highest weighted parameter is outlet drop, as NAACC's scoring guide states "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." The following culverts were ranked the worst due to the size of their outlet drop or other factors as noted.

Table 4-2 Summary of Critically Scored Culverts Based on NAACC Aquatic Passability Scoring

Culvert ID	Aquatic Passability Score [1]	Notes
Pleasant-4	-0.01	Outlet Drop (3’ 4”), Moderate Constriction, Faster Water Velocity in Culvert than Stream
Pleasant-9	-0.01	Outlet Drop (3’ 2”), Moderate Constriction, Large Scour Pool, Shallower Water Depth in Culvert than Stream
LeadMine-1	-0.01	Outlet Drop (3’ 8”), Severe Constriction, Inlet Drop, Small Scour Pool
Middle-11	-0.02	Outlet Drop (4’ 10”), Severe Constriction, Inlet Drop, Large Scour Pool, Shallower Water Depth in Culvert than Stream, Faster Water Velocity in Culvert than Stream
Middle-5	-0.02	Outlet Drop (6’), Moderate Constriction, Inlet Drop, Large Scour Pool
High-5	-0.02	Outlet Drop (7’), Severe Constriction, Large Scour Pool
Railroad-10	-0.02	Outlet Drop (5’ 10”), Severe Constriction, Small Scour Pool, Dry
TownHall-1	-0.02	Outlet Drop (4’ 6”), Severe Constriction, Dry
Maple-1	-0.02	Outlet Drop (6’ 2”), Severe Constriction
Gilbert-2	-0.03	Outlet Drop (1’), Severe Constriction
Whiteloaf-2	-0.03	Outlet Drop (15’), Severe Constriction
Middle-7	0.01	Outlet Drop (2’ 6”), Moderate Constriction, Small Scour Pool
LeadMine-3	0.02	Outlet Drop (2’ 5”), Severe Constriction, Large Scour Pool,
Railroad-11	0.03	Outlet Drop (2’), Severe Constriction, Dry
Coleman-1	0.05	Outlet Drop (1’ 10”), Severe Constriction, Small Scour Pool,
Middle-6	0.06	Outlet Drop (1’ 8”), Moderate Constriction, Large Scour Pool
High-3	0.08	Outlet Drop (1’ 6”), Moderate Constriction, Small Scour Pool
Valley-1	0.12	Outlet Drop (1’), Severe Constriction, Perched Inlet, Large Scour Pool, Shallower Water Depth in Culvert than Stream, Slower Water Velocity in Culvert than Stream
PomeroyMeadow-2	0.16	Outlet Drop (1’ 1”), Moderate Constriction
Fomer-20	0.19	Outlet Drop (1’), Moderate Constriction, Small Scour Pool, Shallower Water Depth in Culvert than Stream, Faster Water Velocity in Culvert than Stream
Maple-4	0.22	Outlet Drop (11”), Moderate Constriction, Small Scour Pool, Shallower Water Depth in Culvert than Stream, Slower Water Velocity in Culvert than Stream
Pleasant-2	0.35	Outlet Drop (8”), Moderate Constriction
Strong-2	0.35	Outlet Drop (3”), Severe Constriction, Small Scour Pool, Shallower Water Depth in Culvert than Stream, Faster Water Velocity in Culvert than Stream
Brickyard-1	0.35	Outlet Drop (8”), Severe Constriction, Small Scour Pool
Pleasant-6	0.38	Outlet Drop (5”), Shallower Water Depth in Culvert than Stream, Faster Water Velocity in Culvert than Stream

[1] As shown in Appendix D, an equation is used to calculate outlet drop (perched outlet). For large, field measured values of outlet drops, the equation can produce a negative score.

4.3.3. Environmental and Societal Assessment

As stated by MA Division of Fisheries and Wildlife, "A Coldwater Fish Resource (CFR) is a waterbody (stream, river, or tributary thereto) used by reproducing coldwater fish to meet one or more of their life history requirements. CFRs are particularly sensitive habitats."[8] 13 **coldwater fisheries** are located within Southampton, as shown by the red lines in **Figure 4-2**. These include Arm Brook, Tripple Brook, Moose Brook, Red Brook, Alder Meadow Brook, Sacket Brook, Manhan River, Broad Brook, North Branch Manhan River, Tucket Brook, Breakneck Brook, Red Brook, and Blue Meadow Brook.



Figure 4-2 Coldwater Fisheries in Southampton
(Source: MassGIS)

Table 4-3 includes a list of Southampton's assessed culverts that are located along a coldwater fishery.

Table 4-3 Assessed Culverts Located Along a Coldwater Fishery

Culvert ID	Address	Coldwater Fishery
Brickyard-3	Brickyard Rd	Moose Brook
CrookedLedge-3	Crooked Ledge Rd	Blue Meadow Brook
Delisle-1	Delisle Rd	Blue Meadow Brook
Douglas-1	Douglas Rd	Arm Brook
East-4	East St	Tripple Brook
Fomer-20	Fomer Rd	Alder Meadow Brook
Fomer-21	Fomer Rd	Red Brook
Pleasant-1	Pleasant St	Tripple Brook

[8] MA Division of Fisheries and Wildlife. URL: https://www.mass.gov/info-details/coldwater-fish-resources

BioMap[9] is the result of an ongoing collaboration between MassWildlife and the Massachusetts Chapter of The Nature Conservancy (TNC). It is a framework for the strategic protection and stewardship of lands and waters that are most important for conserving biological diversity in Massachusetts. BioMap conservation targets are organized into two main elements: **Core Habitat and Critical Natural Landscape**. Core Habitat identifies areas that are critical for the long-term persistence of rare species, exemplary natural communities, and resilient ecosystems. Critical Natural Landscape identifies large landscape blocks that are minimally impacted by development, as well as buffers to core habitats and coastal areas, both of which enhance connectivity and resilience.

There are areas of both Core Habitat and Critical Natural Landscape in Southampton, as shown in **Figure 4-3**. Replacement of culverts located within these areas may be more competitive for grant funding because they are located within areas of high ecological value. For example, the Massachusetts Division of Ecological Restoration's Culvert Replacement Municipal Assistance Grant Program prioritizes funding for "undersized, perched, and/or degraded culvert located in an area of high ecological value" (see Section 6.3 for additional information on grant opportunities).

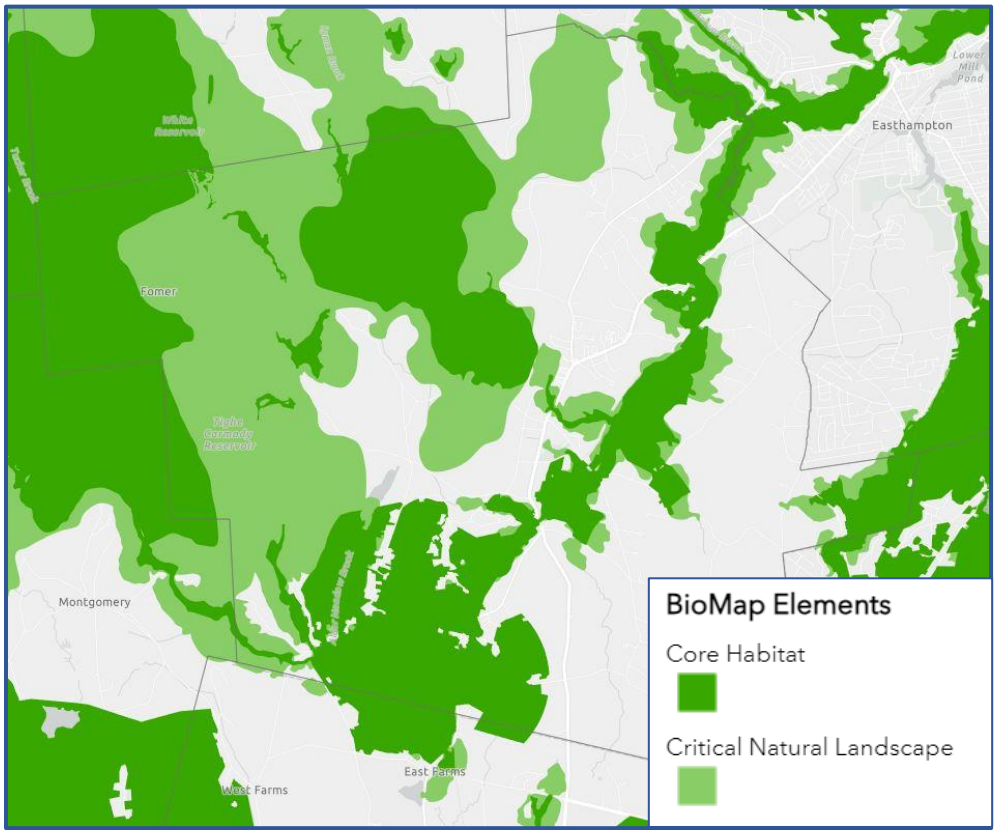


Figure 4-3 BioMap Core Habitat and Critical Natural Landscapes in Southampton

[9] BioMap, MassWildlife and the Massachusetts Chapter of The Nature Conservancy. Online mapping tool is available at the following URL: https://gis.eea.mass.gov/portal/apps/webappviewer/index.html?id=e2b6c291e0294c3281488621aaa095bf

Table 4-4 includes a list of Southampton's assessed culverts that are located within a BioMap area.

Table 4-4 Assessed Culverts Located within a BioMap Area

Culvert ID	Address	BioMap Category
Brickyard-2	Brickyard Ln	Core Habitat & Critical Natural Landscape
Brickyard-3	Brickyard Ln	Core Habitat & Critical Natural Landscape
Brickyard-4	Brickyard Ln	Core Habitat
Clark-2	Clark St	Core Habitat & Critical Natural Landscape
Cook-1	Cook Rd	Core Habitat & Critical Natural Landscape
County-1	County Rd North	Critical Natural Landscape
CrookedLedge-1	Crooked Ledge Rd	Critical Natural Landscape
CrookedLedge-3	Crooked Ledge Rd	Core Habitat & Critical Natural Landscape
Delisle-1	Delisle Rd	Critical Natural Landscape
East-2	East St	Core Habitat & Critical Natural Landscape
East-3	East St	Critical Natural Landscape
East-4	East St	Critical Natural Landscape
Fomer-1	Fomer Rd	Critical Natural Landscape
Fomer-2	Fomer Rd	Critical Natural Landscape
Fomer-4	Fomer Rd	Critical Natural Landscape
Fomer-5	Fomer Rd	Critical Natural Landscape
Gilbert-1	Gilbert Rd	Core Habitat
Gilbert-3	Gilbert Rd	Core Habitat
Gilbert-4	Gilbert Rd	Core Habitat
High-5	High St	Core Habitat & Critical Natural Landscape
Maple-2	Maple St	Critical Natural Landscape
Maple-3	Maple St	Critical Natural Landscape
Maple-4	Maple St	Critical Natural Landscape
Pleasant-1	Pleasant St	Core Habitat & Critical Natural Landscape
Pleasant-2	Pleasant St	Core Habitat
Railroad-1	Manhan Rail Trail	Core Habitat
Railroad-2	Manhan Rail Trail	Core Habitat & Critical Natural Landscape
Railroad-3	Manhan Rail Trail	Core Habitat & Critical Natural Landscape
Railroad-4	Manhan Rail Trail	Core Habitat & Critical Natural Landscape
Railroad-5	Manhan Rail Trail	Critical Natural Landscape
Railroad-6	Manhan Rail Trail	Critical Natural Landscape
Railroad-7	Manhan Rail Trail	Critical Natural Landscape
Railroad-10	Manhan Rail Trail	Critical Natural Landscape
Railroad-11	Manhan Rail Trail	Core Habitat & Critical Natural Landscape
Railroad-12	Manhan Rail Trail	Core Habitat
Railroad-13	Manhan Rail Trail	Core Habitat & Critical Natural Landscape
Riverdale-1	Riverdale Rd	Core Habitat & Critical Natural Landscape

Culvert ID	Address	BioMap Category
Riverdale-2	Riverdale Rd	Core Habitat & Critical Natural Landscape
Russellville-1	Russellville Rd	Core Habitat & Critical Natural Landscape
Valley-1	Valley Rd	Core Habitat
Wolcott-2	Wolcott Rd	Critical Natural Landscape

4.4. Consequence of Failure (CoF)

If a component of Southampton's stormwater system fails, the consequences widely differ in severity and impact to the Town and its residents. A CoF assessment considers hypothetical failure scenarios and the cost or impact of failure on the community, local government, or regulatory compliance. In particular, the CoF for culverts considers extent and severity of flooding and associated impact on the community (e.g., disruption of emergency services due to decreased access or reroute required, impaired ability for residents to egress from their homes/roadway to a main road, or impact to sensitive populations such as schools or nursing homes), the extent and severity of water quality degradation (e.g., impact on drinking water supply, sensitive species, or public bathing or recreational uses), and the difficulty of construction for replacement (e.g., existing site conditions or constraints). In many ways, the CoF rating is subjective since it is often difficult to foresee all the direct and indirect consequences of a failure of an individual piece of equipment or infrastructure.

A summary of the items evaluated to determine the CoF ranking for each culvert location is listed below. These items were considered in terms of a complete culvert failure.

- Culvert size and length
- Whether the culvert meets the stream crossing standard of the span being 1.2 times the bankfull width
- Impact on critical areas (as identified during the Level of Service workshop and Southampton's Hazard Mitigation Plan)
- If the culvert is located along an evacuation route (as identified in Southampton's Hazard Mitigation Plan)
- If the culvert is located within a 100 or 500-year FEMA Flood Zone
- If the culvert is located within an NHESP Priority/Estimated Habitat
- If the culvert is in close proximity to buildings
- Roadway class or type
- If a town utility (water) crosses the culvert
- Number of houses impacted on a dead-end road OR length of a detour if a culvert failed and closed the road

Appendix E includes the methodology, criteria, ranking, weight, and maximum possible points for determining each asset's CoF. CoF factors were weighted based on the severity of the impact. Assets were evaluated for each criterion and assigned rankings based on the determined weighting factor. The value of each CoF category was summed and divided by the maximum possible CoF value to determine a normalized CoF for each drainage asset on a 0 to 1 scale, with a minimum score of 0 (most critical CoF) and a maximum

score of 1 (least critical CoF). See Section 4.5 for a visual representation of the range of normalized CoF scores.

4.5. Overall Criticality

Overall criticality for each culvert assessed during field work was determined by evaluating the PoF and CoF. The Criticality values fall into a "high," "medium," or "low" category with a recommended action for each according to **Table 4-5**:

Table 4-5 Criticality Categories and Associated Recommended Actions

Criticality Category	Value	Recommended Action
High	If CoF ≤ 0.5 and PoF < 0.2	Immediate Attention
Medium	If CoF > 0.5 and PoF ≤ 0.2	Aggressive Maintenance
	or	
	If CoF ≤ 0.5 and PoF > 0.2	Aggressive Monitoring
Low	If CoF > 0.5 and PoF > 0.2	Routine Maintenance and Monitoring

A criticality matrix was created within Excel and the results are shown in **Figure 4-4**. Note that each dot in the figure may represent multiple culverts with the same score. This figure gives a snapshot of the overall condition of Southampton's culverts and indicates that they are largely in good condition (bottom left quadrant), with some in need of regular maintenance and possibly replacement (top left quadrant, high PoF) and monitoring (bottom right quadrant, high CoF).

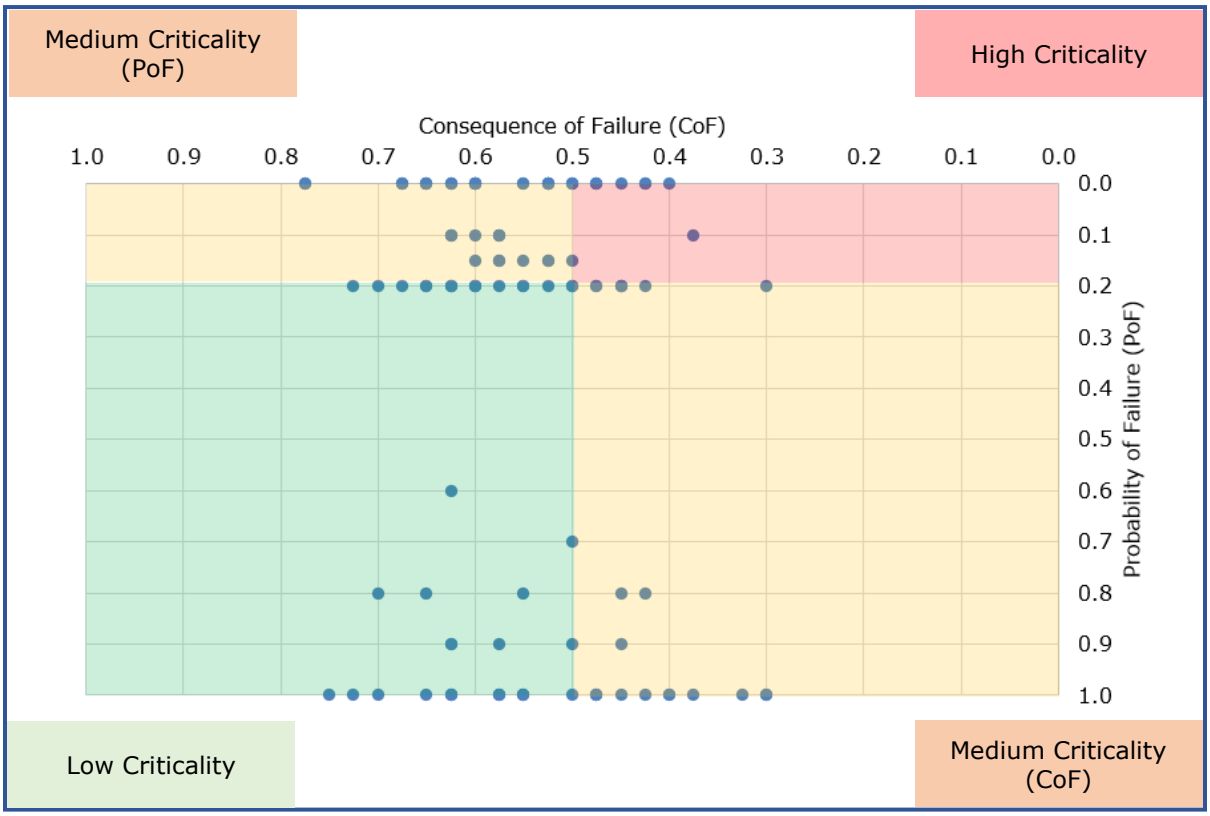


Figure 4-4 Assessed Culvert Criticality Matrix

A summary of the nine (9) culverts with the highest criticality ranking is included in the following table. These culverts are located in the top right quadrant of the overall criticality figure.

Table 4-6 Culverts with High Criticality Scoring

Culvert ID	Location	PoF	CoF	Recommendation
Middle-2	Middle Rd	0.0	0.40	Rehabilitation
Gilbert-3	Gilbert Rd	0.0	0.43	Replacement
TownHall-1	210 College Hwy	0.0	0.45	Maintenance, Further Investigation, Rehabilitation
Pleasant-10	Pleasant St	0.0	0.48	Rehabilitation
Strong-2	Strong Rd	0.0	0.48	Rehabilitation
Brickyard-1	Brickyard Rd	0.0	0.48	Replacement
Pleasant-8	Pleasant St	0.0	0.50	Replacement
Cook-1	Cook St	0.0	0.50	Rehabilitation
ColdSpring-2	Cold Spring Rd	0.1	0.38	Replacement

As described in Section 4.3, not all culverts with a low PoF (high criticality) are in need of replacement within the next 5 years; some may simply need a minor repair or maintenance to extend the service life. Recommendations for these High Criticality culverts are further described in Section 5. The CoF and PoF ranks, criticality score, and priority ranking of each culvert assessed during field work is included in Appendix F.

Section 5 Recommendations

This Section presents recommendations to further refine and implement the Town's Asset Management Program based on work completed to date, including capital improvements, further investigation or study, maintenance needs, and overall programmatic improvements.

5.1. Capital Improvements

Based on this asset management study, the following high priority and medium priority culverts were prioritized for repair or replacement. The table prioritizes high criticality culverts in need of replacement as well as Middle-2 to be addressed in the next ten years. Middle-2 was included with the other high priority replacements because of the critical CoF score and its need for rehabilitation. The remaining culverts all had critical PoF scores and are recommended for the Town to address after the other five high priority culverts. Project Summaries and opinions of probable construction cost (OPCC) are included in Appendix G for the high priority culverts included in years 1-10 in **Table 5-1**. Recommendations for high priority maintenance and repairs are discussed in Section 5.2.

Table 5-1 Recommended Repair or Replacement Capital Improvements

Culvert ID	Location	Summary of Recommendations
Years 1-10		
Middle-2	Middle Rd	Rehabilitation of culvert including lining and new headwalls
Gilbert-3	Gilbert Rd	Replace with concrete box culvert
Brickyard-1	Brickyard Rd	Replace with 60" RCP culvert
Pleasant-8	Pleasant St	Replace with 60" RCP culvert
ColdSpring-2	Cold Spring Rd	Replace with 72" RCP culvert
After Year 10		
Brickyard-2	Brickyard Rd	Replacement
Fomer-4	Fomer Rd	Replacement
Fomer-5	Fomer Rd	Replacement
Brickyard-4	Brickyard Rd	Replacement
Fomer-1	Fomer Rd	Replacement
Fomer-23	Fomer Rd	Replacement
Russellville-6	Russellville Rd	Replacement
Railroad-1	Manhan Rail Trail	Replacement (included in the MassDOT Greenway Project)
Douglas-1	Douglas Rd	Replacement
Wolcott-3	Wolcott Rd	Replacement
Middle-6	Middle Rd	Replacement
Gilbert-1	Gilbert Rd	Replacement
Whiteloaf-3	White Loaf Rd	Replacement

5.1.1. Estimated Replacement Cost Methodology

OPCCs were developed for the five (5) highest priority culvert replacement capital projects and included in Appendix G. Descriptions of our assumptions are summarized in this Section.

It should be noted that these OPCCs were developed using the limited information available based on the field assessment, with no detailed survey or design having been performed. Two (2) of the OPCCs propose replacement of the existing culvert with a concrete box structure due to the stream's bankfull width[10]. Two (2) of the OPCCs propose replacement in-kind with a new culvert pipe. One (1) OPCC proposes rehabilitation of the culvert including lining and new headwalls/wingwalls.

The suitability of box culvert structures assumes competent subsurface conditions at each site to support the proposed replacement structure. All box culverts were assumed to bear directly on grade and it was assumed no spread footings or deep foundations will be required.

The presence of water utilities at each structure was considered based on available data during the development of these OPCCs. The presence of buried gas, electric, and telecommunications utilities is unknown and would need to be confirmed during preliminary design as these utilities can have a significant impact to project costs.

Full road closure was assumed for the purpose of developing these OPCCs. No considerations for phased construction approaches or Accelerated Bridge Construction (ABC) techniques were included in the costs presented.

Engineering, permitting, and construction administration costs are not included in this estimate but are anticipated to be an additional 15% to 20% depending on how the project is phased and the level of service requested by stakeholders. The costs include a 20% Construction Contingency and a 20% Material and Bidding Contingency. Upon further assessment and design of each culvert, these contingencies may be lowered to better reflect the advanced design and bidding climate at the time. Additional engineering and permitting considerations will be determined during the next design phase of the project. It is assumed Chapter 85 review will not be required as intended structure spans will be less than 10 feet.

Replacing existing culverts in-kind would result in cost savings compared to an MSCS-complaint structure. However, additional permitting would be required and permitting agencies may push for an MSCS-complaint replacement. Further, the frequency and intensity of storm events has been increasing and maintaining the same size pipe, rather than increasing its capacity, may result in more frequent flooding and potential roadway failures. Tighe & Bond does not recommend an in-kind replacement approach, unless downstream flooding may occur due to replacing the existing culvert with a larger MSCS compliant structure, or temporary/short term or emergency replacement is required.

[10] One criterion of the Massachusetts Stream Crossing Standards (MSCS) recommends proposed spans to measure 1.2 times the bankfull width of the stream. Bankfull widths for this evaluation included limited data near the crossing location. Detailed evaluation and measurements will be required as these projects advance to design. When available, bankfull width was also verified for the five highest priority culverts using a desktop assessment in StreamStats. These structures were sized to meet MSCS requirements to the maximum extent practicable in the OPCCs.

5.1.2. Alternatives to Replacement: Trenchless Technology

As a more cost-effective alternative to complete replacement of a culvert, there may be instances where a trenchless technology solution (structural lining) is appropriate. This section provides an overview of the major types of trenchless solutions and considerations related to permitting.

Federal, state, and local environmental/wetland regulations discourage the implementation of culvert lining as a preferred alternative for stream crossing improvements. Current regulations, policies, and federal and state stream crossing standards require a number of criteria and design considerations to be evaluated and incorporated into design (e.g., span, openness, bankfull considerations) to the maximum extent for replacement crossings in order to improve the structure's resiliency and ecological value. Culvert lining generally does not comply with these standards and is not preferred by regulatory agencies and, therefore, are generally not advanced as selected alternatives. See Section 6.1.2.1 for additional considerations on permitting trenchless technologies.

If trenchless rehabilitation is preferred for a particular culvert, the Virginia Department of Transportation offers the following selection guideline (2008) for flexible liners[11]. Note that the list of manufacturers in the legend may not be all inclusive.

Table 5-2 Trenchless Technology Selection Guideline

Pipe Deficiency or Site Limitation	Concrete	Corrugated Metal	Plastic
Minor cracks	A, B, C, D, E, F	N/A	A, B, C, D, E, F
Major cracks and/or spalls	A, B, D, E	N/A	A, B, C, D, E
Joints separated by > 1 inch	A, B, C, D, E	A, B, C, D, E	A, B, C, D, E
Coating removed, no or minor corrosion	N/A	A, B, C, D, E, F	N/A
Coating removed, major corrosion	N/A	A, B, C, D, E	N/A
Minor deformation (< 5% inside diameter)	N/A	A, B, C, D, E, F	A, B, C, D, E
Intermediate deformation (5-7% inside diameter)	N/A	A, B, D, E, F	A, B, D, E
Major deformation (>7% inside diameter)	N/A	A, B, D, E	A, B, D, E
Access (limited space to end of pipe, accessible by manhole or drop inlet)	A, B	A, B	A, B
Bends in pipe	A, B	A, B	A, B

Legend:

- A – Cured-in-place pipe (Insituform, CIPP COR72AT470, Am-Liner, National Liner)
- B – Fold and form flexible liner (U-Liner)
- C – Thin-walled high-density polyethylene slipliner (Spirolite, Snap-Tite, Danby)
- D – Thick-walled high-density polyethylene slipliner (N-12, CONTECH A-2, CONTECH A-2000, Ultraliner)
- E – Polyvinyl chloride slipliner (Easy Liner, Lamson Slipliner)
- F – Spray-on polymer (Polyspray Full Structural, Poly-Triplex Liner System)
- N/A – Not applicable

[11] Source: Decision Analysis Guide for Corrugated Metal Culvert Rehabilitation and Replacement Using Trenchless Technology, USDA National Technology & Development Program, December 2012. URL: https://www.fs.fed.us/t-d/pubs/pdfpubs/pdf11771810/pdf11771810Pdpi72.pdf

The following summary provides an overview of these techniques.[11]

Cured-in-Place Pipe (CIPP): CIPP has been used since the 1970s and includes pulling flexible, resin-saturated tubes into existing culvert pipes, applying water or air pressure to invert and expand the tubes, and using steam or hot water to cure the tubes in place. CIPP is considered a structural rehabilitation. It is typically used for pipes that are 6 inches to 96 inches in diameter.

CIPP has minimal cross-sectional reduction and typically improves flow capacity. This method is typically more cost-effective than open cut excavation replacement but may require consideration of site specifics for larger-diameter pipes.

CIPP is typically only successfully applied with minimal or no pipe bends, as the liner can catch or wrinkle. Any obstructions in the existing pipe must be removed before application, and flow must be bypassed during installation. Hydrophilic end seals should be installed to prevent groundwater or streamflow from seeping between the existing pipe and the new liner.

Fold and Form Pipe (FFP): Made of PVC, these liners are manufactured in a folded U or H shape and pulled inside the pipe during installation. Steam or air pressure is used to expand the liner to fit closely to the size and shape of the host pipe. It is typically used for pipes that are 4-inch to 36-inch in diameter.

Sliplining: Sliplining has been used since the 1940s and includes pulling a smaller HDPE or PVC pipe inside of the existing pipe, structurally grouting between the pipe segments, and sealing the ends. Continuous sliplining, where pipe is fused together prior to installation, is also an option.

Sliplining is a cost-effective method and does not require specialty materials or equipment. Bypassing flow is not always necessary, unless implementing continuous sliplining. However, flow capacity is significantly reduced due to the smaller diameter of the replacement pipe.

Spray-in-place pipe (SIPP): Sprayed linings can be used for spot repair of damaged culverts or to form a continuous lining within an existing culvert. Lining materials can be cementitious (cement mortar) or non-cementitious (e.g., epoxy, urethane, polyurethane, polyurea). A spray nozzle is pulled through the pipe, which distributes the lining material to the existing pipe. It is typically used for pipes that are 4-inch to 36-inch in diameter.

The host pipe must be cleaned and spot repaired as necessary prior to SIPP. Flow must be bypassed during construction. Once repairs are made, this rehabilitation is considered a structural rehabilitation. SIPP extends the service life of the pipe and has minimal impact on flow capacity.

5.1.2.1. Considerations for Permitting

Section 7 presents permitting considerations for culvert replacement. However, permitting considerations are somewhat different for trenchless technology. In April 2020, the Navigable Waters Protection Rule[12] went into effect. This rule revises the definition of "Waters of the United States" under the Clean Water Act. This rule specifies that under

[12] https://www.epa.gov/nwpr/final-rule-navigable-waters-protection-rule

Section 404, culverts themselves will be non-jurisdictional, but upstream and downstream still are. For example, if a cofferdam is proposed to be used for dewatering, a Pre-Construction Notification (PCN) would be required from the US Army Corps of Engineers. The PCN requires an assessment and demonstration of compliance with their Stream Crossing Standards.

While trenchless technologies are not typically regulated under a Section 401 Water Quality Certification, the local Conservation Commission and MassDEP region may have additional requirements or restrictions related to these rehabilitation solutions. The Town should determine what would be required to gain approval of trenchless rehabilitation prior to committing to a project.

Projects involving activities other than in-kind replacement or basic maintenance that result in the installation of a different size structure may require Chapter 91 licensing, if the stream is considered a jurisdictional waterway under Chapter 91 of the Massachusetts Public Waterfront Act and implementing regulations at 310 CMR 9.00. Waterways, including all submerged lands lying below the high water mark of any non-tidal river or stream on which public funds have been expended for stream clearance, channel improvement, or any form of flood control or prevention work, either upstream or downstream within the river basin, except for any portion of any such river or stream which is not normally navigable during any season, by any vessel including canoe, kayak, raft, or rowboat are jurisdictional.

Furthermore, any culvert improvements that do not constitute in-kind replacement or routine maintenance that result in a substantial change or enlargement are anticipated to require review as a Notice of Intent under the Massachusetts Wetlands Protection Act and implementing regulations (310 CMR 10.00) as well as the local bylaw for work in jurisdictional wetland resource areas (e.g., Land Under Waterbodies and Waterways, Inland Bank, Bordering Vegetated Wetland, Riverfront Area, and Bordering Land Subject to Flooding).

5.2. Targeted Maintenance and Repairs

Many of the more significant O&M concerns noted during assessments are summarized in Section 3. Additional information is included in the asset inventories and the GIS. As discussed, completing targeted maintenance and repairs may extend a culvert's service life and allow the Town to reassess the Probability of Failure and overall Criticality.

A suggested schedule of targeted maintenance with identified maintenance or repair needs is provided below, which can be modified and adapted to best fit the Town's needs. Once maintenance or repairs are completed, the Town should update the GIS with a record of the work complete and log updated photos. Additionally, the condition of the asset can be reassessed and the PoF and criticality rankings updated.

Table 5-3 Recommended Targeted Maintenance or Repair Schedule

Maintenance Item	Schedule
Targeted replacement recommendations	Address needed replacements in FY2025 through FY2034. Refer to Table 4-1 "Replacement" category as well as Table 5-1.
Targeted maintenance/ rehabilitation recommendations	Address recommended rehabilitation and maintenance. Reassess the culverts as necessary to determine culvert condition. Refer to Table 4-1 "Maintenance/ Further Investigation" and "Rehabilitation" categories.
Targeted monitoring recommendation	Conduct frequent monitoring of the culvert's condition. See Section 5.5.3 for more information. Refer to Table 4-1 "Monitoring" category.
Remove trees after additional assessment	Assess the culverts noted with tree growth annually starting in FY2026 and remove trees damaging the culvert with concurrence from Conservation Commission. Assess annually after removal. Refer to Table 3-2.
Repair roadway features and roadway embankments	Repair roadway features (road, sidewalk, curbing, guardrail) and upstream and/or downstream roadway embankments. Refer to Table 3-3 and Table 3-6.
Further investigation	Clean and conduct further investigations of the culverts that were submerged, buried, and/or not located. Refer to Table 3-7.

5.3. Further Investigation or Study

Culverts that could not be assessed because of sediment, debris, or water levels should be cleaned in order to update the inventory and determine whether there are any deficiencies. For some culverts, Tighe & Bond was able to obtain enough condition information to determine a high PoF; however, additional investigation is recommended prior to design to provide additional information about the condition and identify possible construction constraints. **Table 3-7** includes a summary of culverts that could not be assessed and require additional investigation.

Once maintenance is complete, we recommend completing assessments at the higher priority culverts that had substantial sediment buildup. The Town should use additional information from future assessments to revise the PoF score and overall criticality rank. For example, additional evidence of risk of failure for a high CoF culvert would increase the criticality rank to High and require expedited improvements at the culvert.

5.3.1. Culvert Hydraulic Analysis

Many of the culverts included in **Table 3-7** were noted to be submerged at the inlet and/or outlet. If water levels do not regularly recede enough to expose the submerged culverts, there may be a hydraulic restriction within the stream branch. The Town should consider completing an additional assessment of hydraulic capacity to confirm whether the culverts are properly sized by completing a capacity analysis for existing culverts in Town using data collected during the 2024 condition assessment field work. The planning-level

hydraulic calculations could assume flow rates from StreamStats without changes or from FEMA FIS if available (no hydrologic analyses) and suggested hydraulic design storm from MassDOT. An "Existing Conditions" and "Proposed Conditions" HY-8 model could be created, where the proposed culvert would be designed to meet stream crossing standards and pass the MassDOT Hydraulic design storm. The analysis could include a summary of the methodology and a results table with the anticipated hydraulic design storm, size to meet stream crossing standards and hydraulics, and whether MassDOT permitting is anticipated.

5.4. Opportunistic Asset Repair or Replacement

Roadway and/or water system improvement projects may offer a cost-effective opportunity to replace or repair stormwater infrastructure within the proposed project extents. Specific roadway and/or water system improvement projects did not influence the prioritization analysis completed herein. The Town should evaluate whether a culvert or other drainage structure replacement or repair is necessary while planning a construction project to assess feasibility of including additional stormwater system upgrades as part of the project. In some cases, a lower priority asset could be proactively addressed during a planned capital project.

5.5. Programmatic Recommendations

Based on the work completed as part of developing this program, Tighe & Bond is providing the following programmatic recommendations to help the Town plan and schedule key asset management activities for AMP implementation in the near-term.

5.5.1. Ongoing Stormwater Management Program Implementation

The Town recognizes that the stormwater system is a necessary public utility and in an ongoing effort to minimize stormwater impacts within Southampton, has worked to develop stormwater management within Town. In order to continue to support its goals, recommended maintenance, rehabilitation, and replacement of its culverts will help mitigate flooding.

5.5.2. Coordinate with MassDOT on Bridges Identified

The Town of Southampton should coordinate with the MassDOT BIMS system by providing location information for crossings that should be considered short span bridges or bridges (see Section 2.1). Southampton staff can coordinate directly with the District 2 Engineer. The benefit of doing this is that MassDOT will ultimately provide an inventory and complete assessments of the small span bridges consistent with the State's system, and those locations are eligible for funding under the Municipal Small Bridge Program. See Section 6.2 for more information about the Program.

5.5.3. Develop a Routine Assessment Program

The Town of Southampton should develop a routine culvert assessment program. The culvert assessment protocol and electronic field form developed as part of this project established a baseline condition of all existing Town-owned culverts. The Town should continue to complete re-assessments of the culverts. Re-assessments do not need to consist of a full inventory, but instead should be completed to collect comparative information and to continue to monitor condition over time. Photographs and limited notes are critical to follow-up. A goal of each culvert being assessed every five (5) years at a minimum is recommended. Assessment frequencies should be more frequent for culverts with critical CoF and for CMP culverts.

5.5.4. Additional Staff Training

Applicable Town staff should be trained upon hiring and regularly thereafter on how to properly complete the various components in the culvert asset management program, including inventory data collection, assessments, workflow, and record management. Incorporate GIS applications into staff training wherever possible.

5.5.5. Data Collection and Tracking

The Town should implement GIS data management practices to manage the Town's stormwater assets across Town departments. A consistent workflow and record management process is recommended for culvert and drainage system management. The current data collection forms can be used for new culverts located or installed and adapted for future reassessments as needed. The Town should evaluate the current workflow and records management process to identify any needed changes or updates.

5.5.6. Continued Risk Assessment

Broaden the Asset Management Program risk assessment evaluation to rank all stormwater assets into a high, medium, and low priority list to help inform future stormwater capital improvement projects. The ranking should be updated continuously as infrastructure is newly assessed, replaced, and/or rehabilitated.

5.5.7. Additional Public Education and Outreach

As drainage system improvements are completed, the Town could consider a public education campaign outlining the work and how it improves both water quality and drainage performance.

5.5.8. Staff and Equipment

The Town will need to evaluate the necessity of hiring additional Highway Department staff and purchasing additional vehicles and equipment to implement and oversee the recommendations described. In the future, building upon the Town's existing Highway staff may improve workflow and tracking drainage-related expenditures. See Section 6 for additional analysis of the Town's stormwater funding needs.

Section 6 Funding Considerations for Implementing the AMP

The previous sections demonstrated the Town's initiative and desire to proactively manage their culverts. However, the greatest challenge associated with implementation of any asset management program is a municipality's ability to consistently allocate funds to pay for the improvements identified in Section 5.

6.1. Anticipated Future Program Costs

As detailed in the OPCCs provided in Appendix G, culvert replacements represent a significant expense. To improve the overall condition of the Town's drainage system, an annual investment of approximately $1.0 to $2.0 million in culvert capital improvements is recommended. With aging stormwater infrastructure, localized erosion and flooding concerns, and growing regulatory requirements for stormwater management, the Town should consider establishing a Stormwater Enterprise Fund and/or exploring additional funding mechanisms described in the following section. A Stormwater Enterprise Fund would create a consistent revenue stream to support the ongoing maintenance and replacement of culverts, as well as the broader closed drainage system.

6.2. Additional Stormwater Funding Opportunities

There are additional revenue sources that can augment Town funds in the form of grants and loans. The following State or Federal grant and loan programs were investigated for eligibility and reliability of obtaining funds for implementation of the AMP:

- Massachusetts Chapter 90 Program;
- Clean Water State Revolving Fund (SRF) Loan Program;
- Section 319 Nonpoint Source Competitive Grants Program;
- Section 604b Grant Program: Water Quality Management Planning;
- Stormwater MS4 Municipal Assistance Grant Program;
- Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance Grant;
- Municipal Vulnerability Preparedness (MVP) Action Grant Program;
- MassDOT Municipal Small Bridge Program;
- DER Culvert Replacement Municipal Assistance Grant Program; and
- Massachusetts Community One-Stop for Growth Program.

Table 6-1 summarizes key information on these potential funding sources to determine the feasibility of procuring funds for Southampton's Stormwater AMP. The Town should investigate these further to determine if any are appropriate for planned projects. Additional information on these funding sources and other potential funding options is

provided by the Massachusetts Office of Coastal Zone Management "Available Funding for Stormwater Projects in Massachusetts" webpage.[13]

Advantages

- Additional funding sources could lessen the burden on the Town's taxpayers or ratepayers.
- Southampton staff is familiar with grant and loan application processes.

Disadvantages

- Grants and loans are not a reliable funding source.
- There are increased administration costs associated with grant or loan application and management.
- While some grant projects may help meet some Small MS4 General Permit requirements, projects will need to significantly advance other State initiatives such as improving water quality, resiliency, environmental justice, or climate mitigation to be considered for funding.

[13] https://www.mass.gov/service-details/available-funding-for-stormwater-projects-in-massachusetts

Table 6-1 Summary of Potential Grant and Loan Funding Sources

Grant/Loan Program	Eligible Project Types – Relevant to Stormwater	Funding	Additional Notes
Chapter 90 Funds Grant Program	Capital improvement projects such as highway construction, preservation and improvement projects that create or extend the life of capital facilities. Includes roadside drainage projects incidental to roadway projects.	100% reimbursable loan program. FY2024 apportionment for the Town of Southampton is $315,721.85[14]	For additional information see: https://www.mass.gov/chapter-90-program#:~:text=Chapter%2090%20entitles%20cities%20and,the%20life%20of%20capital%20facilities
Clean Water SRF Loan Program	Projects that help to meet water quality standards and create clean water systems. The program emphasizes watershed management priorities, stormwater management, and green infrastructure. Eligible projects include, but are not limited to: • Nonpoint source pollution abatement projects, such as pollution prevention and stormwater remediation. • Non-structural projects, such as green infrastructure planning projects for nonpoint source problems which are consistent with the MassDEP's Nonpoint Source Management Plan and that identify pollution sources and suggest potential remediation strategies.	Low-interest loan program. The current subsidy is provided via a 2% interest loan or a 0% interest loan for certain wastewater nutrient management projects. In recent years, the program has operated with $400 to $450 million per year, representing the financing of 50 to 70 projects annually.	Competitive projects: • Will have demonstrable water quality benefits. • Will eliminate or mitigate a risk to public health. • Is needed to achieve or maintain compliance with applicable discharge permits or other water pollution control requirements. • Will implement or be consistent with watershed management plans (or addresses a watershed priority) and is consistent with local and regional growth plan. For additional information see: https://www.mass.gov/service-details/srf-clean-water-program

[14] https://www.mass.gov/info-details/chapter-90-past-apportionment

Grant/Loan Program	Eligible Project Types – Relevant to Stormwater	Funding	Additional Notes
Section 319 Nonpoint Source Competitive Grants Program	Projects that address the prevention, control, and abatement of nonpoint source pollution. NPDES and MS4 permit required items are not eligible under this grant program unless projects are outside of the Regulated Area or completed in advance of permit deadlines. In general, eligible projects must: • Implement measures that address the prevention, control, and abatement of NPS pollution. • Target the major source(s) of nonpoint source pollution within a watershed/sub-watershed. • Contain an appropriate method for evaluating the project results. • Address activities that are identified in the Massachusetts NPS Management Plan. Draft and Final NPDES MS4 and RDA stormwater permit requirements will dictate project eligibility. Projects within MS4 regulated areas that meet the grant program requirements are eligible provided the work is not required under a current or pending NPDES stormwater permit. In areas regulated by these permits, s.319 funds cannot be used for work that is required in the permits. The regulated discharges become point sources that are no longer eligible for nonpoint source funding. A municipality that contains both regulated and unregulated areas is eligible for s.319 funds for work in the unregulated area.	Funds are paid on a reimbursement basis, and MassDEP retains 10% of the award amount until the project is finalized. From FY1990-2021, individual grant awards have ranged from $10,000-$500,000. For FY2022 the total anticipated grant expenditure was $1,600,000, with MassDEP having the discretion to award various funding amounts per project.	For additional information see: https://www.mass.gov/info-details/grants-financial-assistance-watersheds-water-quality https://www.mass.gov/guides/determining-ms4-status-of-the-project-area

Grant/Loan Program	Eligible Project Types – Relevant to Stormwater	Funding	Additional Notes
Section 604b Grant Program: Water Quality Management Planning	Projects that address water quality assessment and management planning. For FY2022, MassDEP focused funds on watershed or sub-watershed based nonpoint source assessment and planning projects that result in one of the following: • Development of Watershed-based Plans (WBP) for local watershed planning and to support future 319 grant implementation projects. • Development of a WBP for the Section 319 Grant's Healthy Watersheds Project, to be used to guide watershed protection and management activities. • Determination of the nature, extent, and causes of water quality problems and determination of pollutant load reductions necessary to meet water quality standards. • Development of preliminary designs and implementation plans that will address water quality impairments in impaired watersheds. • Development of green infrastructure projects that manage wet weather events to maintain or restore natural hydrology. (See https://www.mass.gov/info-details/grants-financial-assistance-watersheds-water-quality#604(b)-grant-program:-water-quality-management-planning-)	In general, individual grant awards range from $25,000-$50,000 and approximately 4 to 6 projects are selected annually. A monetary match is not required but is preferred. Funds are paid on a reimbursement basis, and MassDEP retains 10% of the award amount until the project is finalized.	Competitive projects: • Support basin-wide water quality management activities. • Identify sources of water quality impairment due to nonpoint source pollution in high priority waterbodies • Use watershed-based plans to build partnerships and build capacity as well as identify water quality remediation or protection strategies in high priority waterbodies. • Link the proposed Best Management Practice (BMP) to the pollutant of concern and impact to targeted water resources. • Provide clearly defined, practical, and cost-effective objectives. • Propose strategies with a high likelihood of success. • Consider long-term resiliency to climate change impacts in site prioritization, design, siting, and selection of BMPs. For additional information see: https://www.mass.gov/info-details/grants-financial-assistance-watersheds-water-quality

Grant/Loan Program	Eligible Project Types – Relevant to Stormwater	Funding	Additional Notes
Stormwater MS4 Municipal Assistance Grant Program	Applicants must be groups of two or more Massachusetts municipalities or Regional Planning Agencies, stormwater coalitions, or non-profit organizations representing two or more municipalities that are subject to the 2016 Small MS4 General Permit. Southampton could participate in a grant-funded project through the Northern Middlesex Stormwater Collaborative. Projects must result in tools or approaches that will help multiple municipalities meet one or more requirement(s) of the 2016 Small MS4 General Permit. Eligible projects must also: • Provide a shared benefit to multiple communities, including environmental justice communities. • Not duplicate work already done by any Massachusetts stormwater coalition or where a previously funded project delivery is applied to another region. • Examples of potentially eligible, MS4-focused projects include, but are not limited to: (see list here https://www.mass.gov/doc/notice-of-grant-opportunity-ms4-municipal-assistance-2022-2023-grant-program/download).	Total funding currently available under this grant is $300,000 and individual awards typically range from $50,000 to $300,000. Applicants are not required to provide matching funds but are encouraged to identify other known sources of funding.	For additional information see: https://www.mass.gov/info-details/grants-financial-assistance-watersheds-water-quality#stormwater-ms4-municipal-assistance-grant-program-

Grant/Loan Program	Eligible Project Types – Relevant to Stormwater	Funding	Additional Notes
FEMA Hazard Mitigation Assistance Grants	A variety of mitigation projects including, but not limited to: • Drainage improvement projects to reduce flooding (flood risk reduction projects). • Retrofits to utilities and other infrastructure to enhance resistance to natural hazards (utility retrofits).	Funding is based on the estimated total or aggregate cost of disaster assistance: • Up to 15% of the first $2 billion. • Up to 10% for amounts between $2 billion and $10 billion. • Up to 7.5% for amounts between $10 billion and $35.333 billion. • States with enhanced mitigation plans: Up to 20%, not to exceed $35.333 billion.	Communities must submit a sub-applicant application to the state who submits it to FEMA. A non-federal cost share is required for all sub-applications funded under HMGP and may consist of cash, donated or third-party in-kind services, materials, or any combination thereof. Generally, the cost share is 75% federal/25% non-federal. For additional information see: https://www.fema.gov/grants/mitigation/hazard-mitigation
Municipal Vulnerability Preparedness (MVP) Action Grant Program	Open to municipalities who have completed the Community Resilience Building (CRB) process and received MVP Community designation from EEA. The MVP program's 10 Core Principles should be incorporated into the application: (see full list here: https://www.mass.gov/doc/mvp-core-principles/download)	Projects are required to provide monthly updates, project deliverables, and a brief project case study of lessons learned. Eligible applicants can request up to $3,000,000 in funding. The municipality is required to match 25% of total project cost using cash or in-kind contributions.	For additional information see: https://www.mass.gov/service-details/mvp-action-grant
MassDOT Municipal Small Bridge Program	Bridges must be on a local public way and must be on the State Bridge Inventory with a span between 10 and 20 feet.	Each municipality may receive up to $100,000 for design services and $500,000 for construction per year to aid in the replacement and preservation of Town-owned bridges. Costs over $500,000 will be borne by the Town. This program provides for state reimbursement to municipalities of up to 100% of the total design and construction cost of eligible projects. MassDOT and selected municipalities enter into an agreement to reimburse funds for approved projects.	For additional information see: https://www.mass.gov/municipal-small-bridge-program

Grant/Loan Program	Eligible Project Types – Relevant to Stormwater	Funding	Additional Notes
DER Culvert Replacement Municipal Assistance Grant Program	The Division of Ecological Restoration's (DER's) Culvert Replacement Municipal Grant Program is for Massachusetts municipalities interested in replacing an undersized, perched, and/or degraded culvert located in an area of high ecological value. The purpose of this funding is to encourage municipalities to replace culverts with better designed crossings that meet improved structural and environmental design standards and flood resiliency criteria. Only projects that intend to meet the goals of the Massachusetts Stream Crossing Standards will be considered for funding.	Awards may range from $25,000 to $400,000 depending on the project phase and work proposed.	For additional information see: https://www.mass.gov/how-to/culvert-replacement-municipal-assistance-grant-program
Massachusetts Community One-Stop for Growth Program	The One Stop program is a repository for multiple state grant programs. If an Expression of Interest (EOI) is submitted, the program helps to identify which grant program is most applicable for the proposed scope of work.	Awards may range from $10,000 to $4,000,000 depending on the project work proposed and grant program recommended.	For additional information see: https://www.mass.gov/info-details/community-one-stop-for-growth

Section 7 Permitting for Culvert Replacements

Drainage system replacement or repair projects, specifically for culverts, may require permits under the following regulatory programs. Permitting needs will depend on site-specific conditions, the selected design, and impact areas.

- **Wetlands Protection Act Notice of Intent/Order of Conditions** – Culvert improvements are assumed to involve work within jurisdictional resource areas regulated by the Massachusetts Wetlands Protection Act (WPA; *M.G.L. c. 131*, § *40*) and implementing regulations (310 CMR 10.00). It is assumed that a Notice of Intent (NOI) filing would be required with the Southampton Conservation Commission and MassDEP.
- **Massachusetts Environmental Policy Act (MEPA)** – Depending on the project, review thresholds set forth by MEPA (defined under 301 CMR 11.03) may be exceeded and the preparation and submittal of an Environmental Notification Form (ENF) could be required. MEPA review involves submission of an ENF to the Office of Energy and Environmental Affairs (EEA), public notice requirements, a site visit, and response to comments resulting from the public comment period.
- **Massachusetts Endangered Species Act (MESA) Review** – Depending on the culvert location, *Priority Habitats of Rare Species* or *Estimated Habitats of Rare Wildlife* may be present. If present, the project may be subject to a MESA Project Review. Rare Species Information Request would likely also need to be submitted the Massachusetts Natural Heritage and Endangered Species Program (NHESP) to verify the species identified within the project area to guide project design and best management practice development.
- **Chapter 91 Waterways License** – Projects involving activities other than in-kind replacement or basic maintenance that result in the installation of a different size structure may require Chapter 91 licensing, if the stream is considered a jurisdictional waterway under Chapter 91 of the Massachusetts Public Waterfront Act and implementing regulations at 310 CMR 9.00. Waterways, including all submerged lands lying below the high water mark of any non-tidal river or stream on which public funds have been expended for stream clearance, channel improvement, or any form of flood control or prevention work, either upstream or downstream within the river basin, except for any portion of any such river or stream which is not normally navigable during any season, by any vessel including canoe, kayak, raft, or rowboat are jurisdictional.
- **Section 401 Water Quality Certification** – A Section 401 Water Quality Certification (WQC) may be required for culvert replacements if any project results in either in a loss of 5,000 square feet cumulatively of Bordering or Isolated Vegetated Wetlands and Land Under Water, the amount of any proposed dredging is greater than 100 cubic yards, or if any of the other thresholds listed in 314 CMR 9.04 are met. If impact areas do not exceed these thresholds, the WPA Order of Conditions will serve as the 401 WQC.
- **Section 404 Army Corps Pre-Construction Notification** – Culvert replacement projects will involve work within Wetlands and Waters of the United States regulated under Section 404 of the Clean Water Act. The Corps' General Permits (GP) for Massachusetts cover specific activities within the limits of Corps'

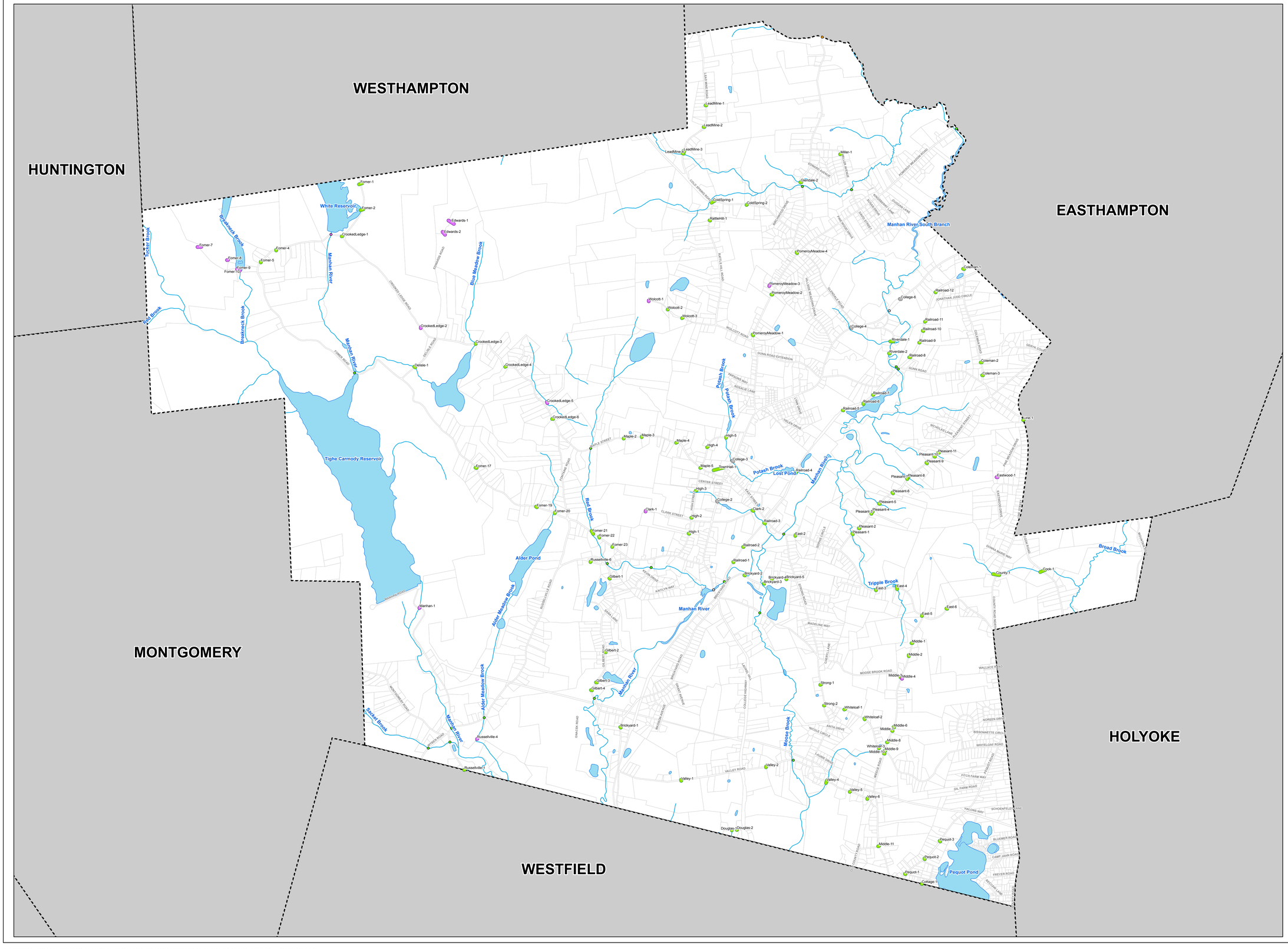
jurisdiction as stated in each of the activity General Permits. The total temporary and permanent impact area is used to determine if a project is eligible for Self-Verification, Pre-Construction Notification, or Individual Permit coverage. It is assumed that most, if not all, of the projects would require a permit application to be submitted to the Corps.

In addition to environmental factors, the MA General Permit requires notification of the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officers (THPOs), and the Massachusetts Board of Underwater Archaeological Resources (MABUAR) per Section 106 of the National Historic Preservation Act, which could take place as part of the MHC PNF submittal discussed below.

- **Massachusetts Historic Commission –** Any new construction projects or renovations to existing structures that require funding, licenses, or permits from any state or federal governmental agencies must be reviewed by the State Historic Preservation Officers, including MHC, MABUAR, and pertinent THPOs for impacts to historic and archaeological properties in accordance with Section 106 of the National Historic Preservation Act of 1966 and 950 CMR 71. The purpose of this review is to ensure that projects minimize or mitigate adverse effects to properties listed in the National and/or State Register of Historic Places. It is assumed that a Project Notification Form (PNF) will need to be completed and submitted to relevant parties for all replacement projects. Should review under the MEPA be required, a copy of the MEPA ENF can be provided to these agencies to initiate historical review and will preclude the need to file a PNF.
- **MassDOT State Highway Access Permit –** Any work that is to take place within State Highways, including detours and traffic signage, requires a State Highway Access Permit. The State Highway Access Permit will determine the level of traffic management and control required, changes needed on the alignment, the level of pavement restoration required, the types of bonds and insurances required, and revisions to the design for work in the State Highway.
- **MassDOT Chapter 85 –** If a culvert replacement increases the structure's span to 10 feet or greater (to meet Massachusetts stream crossing standards, for example), it would be considered a bridge by MGL definition. Designs for proposed vehicular bridges in the Commonwealth of Massachusetts are subject to MassDOT review and approval per MGL Chapter 85. The review covers hydraulic, geotechnical, and structural design components. It should be noted that design requirements under MGL Chapter 85 are far more extensive than those of culverts and therefore are more costly to design and construct.

Appendix A
Map of Culvert Locations in Southampton

Culvert Overview Map



LEGEND

Southampton Bridges

Ownership

- Easthampton
- Private
- State
- Town

Southampton Culverts

Ownership

- Private
- State
- Town
- **Hydrology Line**
- **Waterbody**
- **Parcel Boundary**
- **Town Boundary**

LOCUS MAP



0 3,300
Feet

1:19,800

NOTES

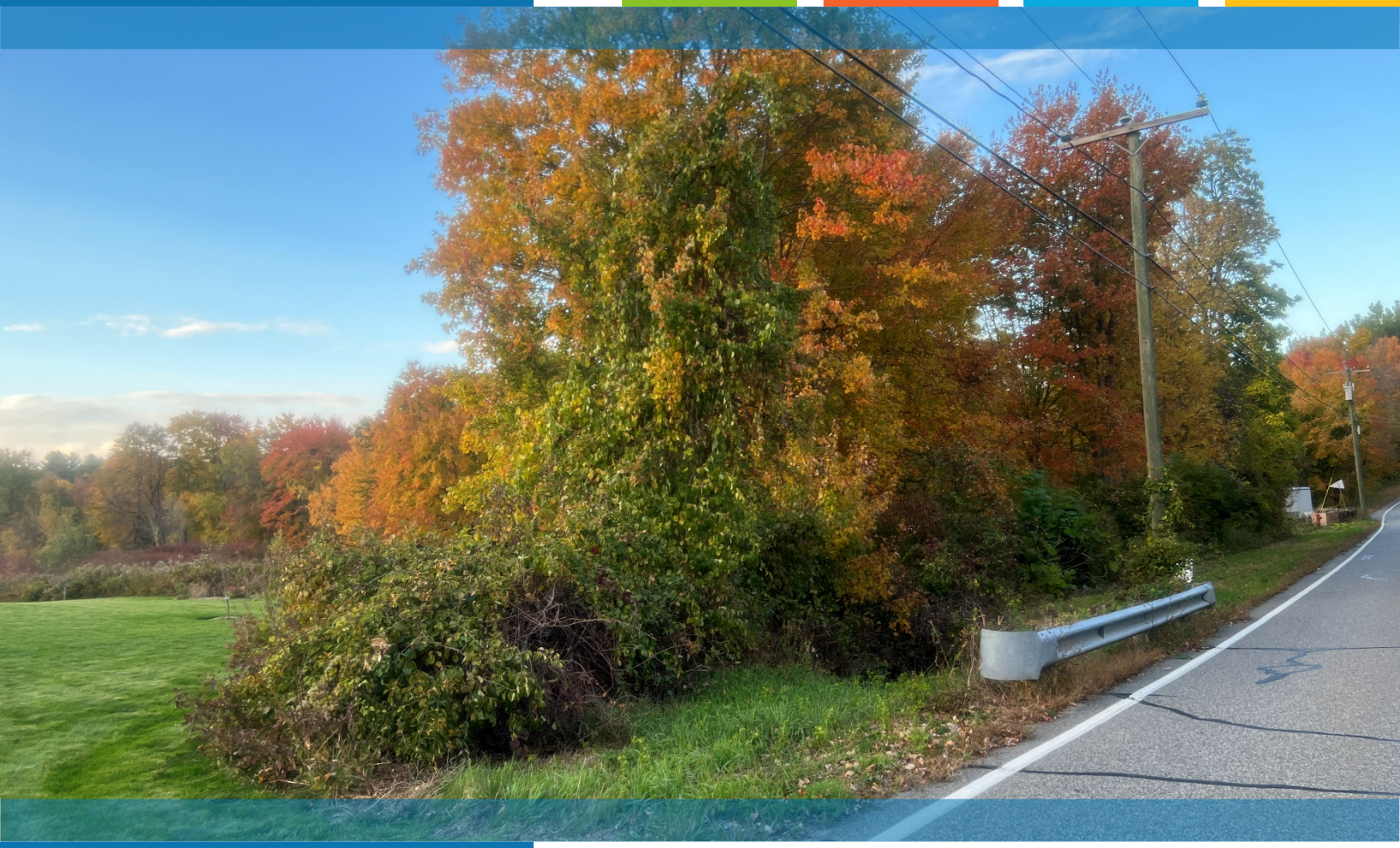
1. Based on USGS Topo Map (1987)
2. MassGIS: Community Boundary (2022), National Wetlands Inventory (2020), MassDOT Major Roads (2023)
3. Town of Southampton: Culverts

Map of Culvert Locations
Southampton, Massachusetts

April 2025

Tighe&Bond

Appendix B
Culvert Assessment Protocol



Southampton Culvert Assessment Protocol

Town of Southampton, MA

March 2024

Tighe&Bond

100% Recyclable

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Section 1
Background

The Town of Southampton is mostly located within the Connecticut River watershed and partially within the Westfield River Watershed. Several brooks and streams flow in Southampton and are carried under roads via culverts throughout town.

Assessment Guidance

Tighe & Bond developed a culvert assessment protocol and field form to be used during field assessments. The assessment information was developed using Tighe & Bond's experience with culvert assessments and the following resources:

- *Culvert Condition Assessment Manual* and *Culvert Assessment Form,* developed by UMass Transportation Center, the Nature Conservancy, North Atlantic Aquatic Connectivity Collaborative (NAACC), and the Center for Agriculture, Food, and the Environment, 2019
- *NAACC Stream Crossing Instruction Manual for Aquatic Passability Assessments in Non-tidal Stream and Rivers* and *Aquatic Connectivity Stream Crossing Survey Data Form,* developed by the North Atlantic Aquatic Connectivity Collaborative, UMass Amherst, November 2019

These NAACC resources were developed to:

> "*provide guidance for completing the North Atlantic Aquatic Connectivity (NAACC) Stream Crossing Survey Data Form.*
> *The North Atlantic Aquatic Connectivity Collaborative (NAACC) is a network of individuals from universities, conservation organizations, and state and federal natural resource and transportation departments focused on improving aquatic connectivity across a thirteen-state region, from Maine to Virginia. The NAACC has developed common protocols for assessing road-stream crossings (culverts and bridges) and developed a regional database for these field data. The information collected will identify high priority bridges and culverts for upgrade and replacement. The NAACC will support planning and decision-making by providing information about where restoration projects are likely to bring the greatest improvements in aquatic connectivity. The survey data form is to be used for an entire road-stream crossing, which may include single or multiple culverts or multiple cell bridges.*"

NAACC has become the industry standard for data collection of this type. Although it is focused on Aquatic Organism Passage (AOP), it also covers standardized data collection for the roadway and culvert. Engineering judgement will be used when evaluating the data for roadway infrastructure improvement purposes.

The following Sections provide guidance from these various resources on conducting the culvert assessments. Please note:

- NAACC defines a bridge as "a deck supported by abutments (or stream banks). It may have more than one cell or section separated by one or more piers". It defines a culvert as "a structure buried under some amount of fill".

  - Crossings with a span greater than 20 feet are bridges that the Federal Highway Administration mandates be inspected in accordance with National Bridge Inspection Standards. These bridges were excluded from this specific town assessment.
  - Crossings with a span greater than 10 feet are recognized as bridges by Massachusetts General Laws, and repair and replacement of these structures are subject to Chapter 85 approval. This includes multiple barrel culverts. MassDOT keeps an inventory of these structures and documentation of these structure inspections is the same as that for the National Bridge Inspection Standards. Thus, crossings of a span greater than or equal to 10 feet are excluded from this specific town assessment. This includes multiple barrel culverts with a span greater than 10 feet.

- The words *crossing* and *culvert* may be used interchangeably throughout this assessment protocol document since both the NAACC Culvert Condition Assessment Manual and the NAACC Stream Crossing Instruction Manuals were used in the development of the guide.

Section 2
Tighe & Bond / Town Data Collection

While primarily using the NAACC protocol for the assessments, Tighe & Bond developed additional assessment criteria for the roadway, culvert, and operation and maintenance concerns that could be indicative of potential modes of failure. **Section 2** outlines these supplemental assessment criteria and provides extra photos and descriptions of each for reference during field work.

Roadway Condition



Adequate: Pavement has no visible defects, small cracks, or maintenance patches. Unpaved roads (gravel, dirt) have minor erosion or ruts.



Poor: Significant cracking, spalling, potholes, or maintenance patches affecting up to 20% of any single travel lane or shoulder. Unpaved roads (gravel, dirt) have erosion, ruts affecting up to 20% of the travel lanes.



Critical: Extensive cracking, spalling, potholes, or maintenance patches affecting at least 20% of any single travel lane or shoulder. Unpaved roads (gravel, dirt) have erosion and ruts affecting at least 20% of the travel lanes.

Survey also includes options of:

- Unknown
- N/A

Other notes within the survey:

- Roadway Observations: Use this text box to explain the condition of the road in more detail (i.e., alligator cracking, missing curbing, etc.)
- Road Sketch: Use this to draw any other roadway observations you'd like to note.

Sidewalk

Sidewalk Location

Note the presence or absence of a sidewalk on one or both sides of the crossing.

Sidewalk Material

- Asphalt
- Granite
- Concrete
- Other – use this option to describe if more than one material is present.

Sidewalk Condition*



Adequate: Some slight wear and a few areas with larger shallow cracks.



Poor: Sidewalk has patching and cracks.



Critical: Sidewalk has cracks and patches covering more than half the surface.

Survey also includes option of:

- **Other** to describe different conditions if 2 sidewalks are present and of differing conditions.

**Note: The assessment does not consider ADA requirements.*

Curbing

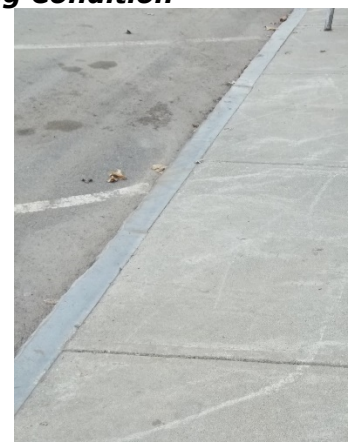
Curbing Location

Note the presence or absence of curbing on one or both sides of the crossing.

Curbing Material

- Asphalt Berm
- Granite Curb
- Concrete Curb
- Other - use this option to describe if more than one material is present.

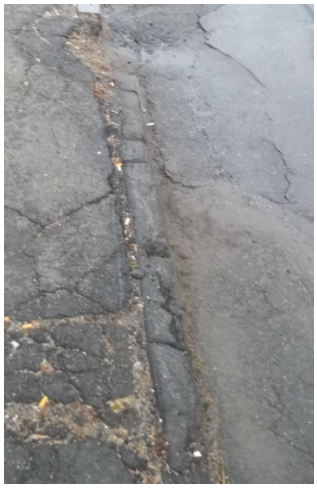
Curbing Condition*



Adequate: Majority (over 70%) is in good condition; minimal damage or chipping.



Poor: Some areas of worn and damaged curbing with chips and other damage visible, and some areas of curbing in good condition.



Critical: Significant areas of worn and damaged curbing.

Survey also includes option of:

- **Other** to describe different conditions if 2 curbs are present and of differing conditions.

**Note: The assessment does not consider ADA requirements.*

Pavement Width

Measured from edge of pavement to edge of pavement perpendicular to the roadway.



Guardrail

Guardrail Location

Note the presence or absence of a rail system on **one** or **both sides** of the crossing.

Guardrail Condition



Adequate: Guardrail has no visible defects.



Poor: Guardrail may be leaning appearing unstable, have significant section loss or deformation.



Critical: Guardrail has severe section loss, severe deformation, missing connections.

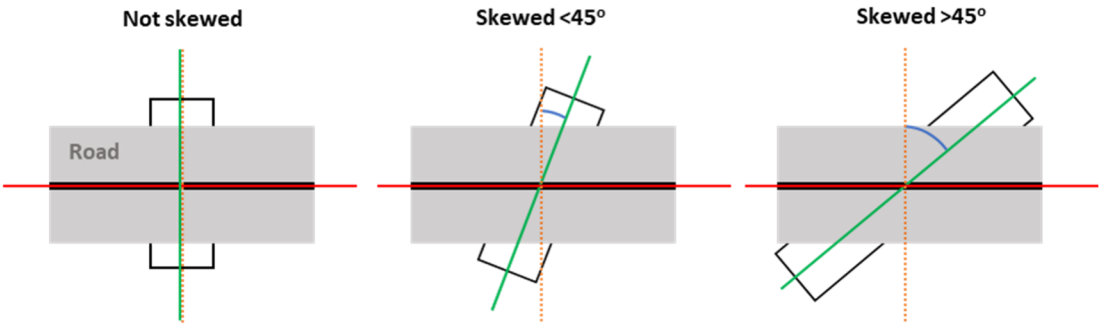
Survey also includes options of:

- **Other** to describe different conditions if 2 guardrails are present and of differing conditions.

Crossing Alignment to Roadway

Indicates the alignment of the crossing structure relative to the roadway. The skew is defined as the angle between the centerline of the crossing (green, solid line) and a line perpendicular (orange, dotted line) to the roadway centerline (red line).

- **No Skew**: Road-aligned, the crossing structure is situated at roughly a 90-degree angle (perpendicular) to the road.
- **Skewed** (<45-degrees or >45-degrees): The crossing is not situated at roughly a 90-degree angle to the road. Note whether it is less or more than 45-degrees.

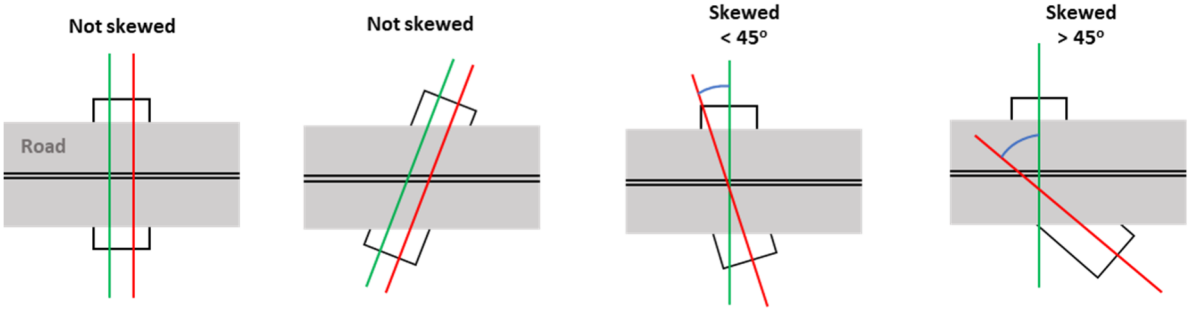


Note: Sketch developed by Tighe & Bond based on NAACC Stream Crossing Instruction Manual (2019) "Alignment" description.

Bend Mid-Crossing

Indicates the alignment of the crossing structure relative to the direction of the crossing inlet. Compare the centerline of the crossing inlet to the centerline of the crossing outlet.

- **None**: The centerline of the crossing is straight throughout the entire crossing.
- **Skewed** (<45-degrees or >45-degrees): The crossing structure alignment changes under the roadway. Note whether it is less or more than 45-degrees.



Note: Sketch developed by Tighe & Bond based on NAACC Stream Crossing Instruction Manual (2019) "Alignment" description.

Distance Between Culvert Barrels

When multiple barrels are present, measure the distance between each barrel (upstream and downstream). The measurement is taken from inside of the first pipe horizontal to the inside of the second pipe.



Tree Present by Headwall/Wingwall

Note the presence of trees within close enough proximity to the structure that the roots could undermine the structural integrity.



Condition of Upstream & Downstream Roadway Embankment



Adequate: No noteworthy deficiencies which affect the condition of the embankment protection.



Critical: Embankment protection has failed causing severe scour of embankment and threatening the stability of the roadway embankment.



Poor: Embankment protection is severely undermined causing significant erosion of embankment and in need of immediate repairs.

Headwall & Wingwall Materials

If present, select or describe the material:



Concrete



Stone

Upstream Scour

Note if Present:

- Yes
- No
- Unknown

Note the Location:

- Culvert
- Wingwalls
- Footings

Note the Damage:



Small: Minor undermining of the culvert barrel or wingwall, and/or the footing is exposed.



Large: Significant/extensive undermining and exposure of the culvert barrel, wingwall, and/or footing.

Operation & Maintenance: Potential Illicit Discharges

Note the Location:

- Nearby Outfall Upstream/Downstream
- Observed at Inlet/Outlet
- Unknown

Note the Evidence:

- Odor
- Discoloration of Flow
- Floatables (does not include trash)
- Deposits or Staining
- Excessive Vegetation or Benthic Growth
- Suds
- Yard Waste
- Trash
- Oil
- Other

















Beaver Dam Near Crossing

If a beaver dam is observed upstream or downstream of the crossing, note its location and measure/approximate the distance from the crossing inlet or outlet.



Field Recommendations

Is further action required? This includes None, Maintenance, Rehabilitation, or Replacement of the culvert. This data is used for daily quality control and as a screening tool for immediate town follow-up needs.

Section 3
NAACC Data Collection

See attached NAACC Stream Crossing Instruction Manual (2019) and Culvert Condition Assessment Manual and Form (2019) for explanations of criteria used in the Southampton culvert condition assessments. Comments in red text were added by Tighe & Bond if there were modifications made for the Tighe & Bond assessment form.

NAACC Stream Crossing Instruction Manual Table of Contents

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NAACC Stream Crossing Instruction Manual for Aquatic Passability Assessments in Non-tidal Stream and Rivers



North Atlantic Aquatic Connectivity Collaborative

Version 1.3 – June 2, 2019
(for Data Form dated May 26, 2016)

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ACKNOWLEDGEMENTS

The development of this instruction guide and the survey protocol it explains would not have been possible without the effort of many people involved with the NAACC. First and foremost, we would like to thank our colleagues from the NAACC Core Group who worked so diligently to develop and refine the concepts reflected here, and the documents resulting from their many days and hours of effort. The core group includes Rich Kirn of the Vermont Department of Fish and Wildlife, Jessie Levine, Erik Martin, and Michelle Brown of The Nature Conservancy, Jed Wright of the U.S. Fish and Wildlife Service Gulf of Maine Coastal Program, Melissa Ocana and Bob English of the University of Massachusetts Amherst, and Keith Nislow of the U.S. Forest Service. We are particularly thankful to Jessie Levine for her many hours of thorough editing.

In addition, the NAACC relies on a Working Group composed of dozens of professionals working across the region in state and federal agencies and nongovernmental organizations dedicated to improving stream connectivity for the health and resilience of our aquatic and terrestrial ecosystems, as well as safeguarding our infrastructure in the face of a changing climate and increasingly intense, and sometimes devastating storms. Thanks to all those who have lent their time and expertise to making our collaborative successful.

And, finally, thanks to the U.S. Fish and Wildlife Service North Atlantic Landscape Conservation Cooperative for funding this important work.

Alex Abbott & Scott Jackson

Suggested Citation

Abbott, A. and S. D. Jackson. 2019. NAACC Stream Crossing Instruction Manual for Aquatic Passability Assessments in Non-tidal Stream and Rivers. North Atlantic Aquatic Connectivity Collaborative (NAACC), University of Massachusetts Amherst. June 2, 2019. 33 pp.

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OVERVIEW

This document provides guidance for completing the North Atlantic Aquatic Connectivity (NAACC) Stream Crossing Survey Data Form.

The North Atlantic Aquatic Connectivity Collaborative (NAACC) is a network of individuals from universities, conservation organizations, and state and federal natural resource and transportation departments focused on improving aquatic connectivity across a thirteen-state region, from Maine to Virginia. The NAACC has developed common protocols for assessing road-stream crossings (culverts and bridges) and developed a regional database for these field data. The information collected will identify high priority bridges and culverts for upgrade and replacement. The NAACC will support planning and decision-making by providing information about where restoration projects are likely to bring the greatest improvements in aquatic connectivity.

The survey data form is to be used for an entire road-stream crossing, which may include single or multiple culverts or multiple cell bridges. On the first page, the top of the form contains general information about the crossing, and the bottom half of that page is for data on the first (or only) structure at the crossing. Subsequent pages are used to add data where there are additional culverts or bridge cells. It can be difficult to determine how best to evaluate multiple culvert/cell crossings. Please remember that it is essential to gather all of the data required for each structure (pipe or bridge cell) for accurate assessment of the entire crossing.

Stream crossing survey data can be collected digitally on a variety of devices, including tablet computers and smart phones. While data collected digitally must be reviewed before upload to the NAACC database, data upload can be done in "batches" without the need for manual entry. Paper forms can also be used, with subsequent manual data entry to the NAACC online database. Further instructions for data entry by each of these methods is provided in survey training sessions, and at www.streamcontinuity.org.

Please be sure to complete every possible element of the field data form.

SURVEY PLANNING

GENERAL PLANNING

Any effort to survey stream crossings should be based on a plan that includes answers to the following key questions:

1. ***Who is primarily responsible for managing the surveys?***
   Each NAACC state or region has a coordinator who helps decide on priority areas for survey and how to manage the data once surveys are completed. This coordinator will also plan for, oversee, and collect data from the surveys. Contact the project at contact@streamcontinuity.org for more information, or refer to the NAACC website to locate a coordinator in your region: https://www.streamcontinuity.org/participating_states.htm.

2. ***How will surveyors be trained?***
   Training should be arranged through your regional or state coordinator, and includes both classroom and field survey practice. Trainings are posted on https://www.streamcontinuity.org/about_naacc/training_prog.htm. The most important elements of training are becoming familiar with this instruction manual and gaining practice through survey of a variety of crossings with an experienced surveyor.

3. ***When should surveys be done?***
   Ideally, surveys should be conducted during low-flow periods, particularly summer and early fall.

4. ***How should we decide where to survey?***
   Consult with your regional coordinator to decide whether surveys will be conducted in one or more watersheds, towns, or counties. Plan to have maps to help you navigate to sites you plan to survey, either copies of existing maps such as the DeLorme Atlas and Gazeteer, or more sophisticated maps from a geographic information system (GIS). When collecting data digitally on a tablet computer or smart phone, survey coordinators must identify and map planned survey sites for your chosen survey area.

   For each state in the NAACC region, United States Geological Survey (USGS) HUC-12 subwatersheds have been prioritized for field surveys by the NAACC project team. These subwatersheds were prioritized based on several objectives including brook trout, diadromous fish, and the potential vulnerability of culverts to failure. These prioritized results can be a useful starting place for identifying areas to survey. In addition, there may be locally important watersheds or habitats in your state or region that may help guide location of surveys. To see the NAACC priority subwatersheds in your area, visit the web map at http://arcg.is/1F2rPJu. This web map also depicts road-stream crossings symbolized by their estimated restoration potential which can help focus survey efforts within a subwatershed.

5. ***Which sites will be surveyed?***
   Work with your state or regional coordinator to decide whether all crossings, or only certain types or sizes of streams will be considered. Some crossing surveys focus primarily on designated *perennial* streams containing most aquatic habitats, while other survey projects include all *ephemeral* and *intermittent* streams. In other cases, certain places in the watershed or town may be identified as highest priority for surveys, based on ecological or other criteria.

6. ***How will we keep track of the sites visited?***
   You should maintain records, possibly as notations on paper maps, or in a table listing each planned survey site, showing which sites have been surveyed and when. Organize your survey forms by date, and be sure each survey form is complete. Once data has been entered to the NAACC database (https://streamcontinuity.org/cdb2), you will be able to see all surveyed sites through online maps to verify that you have completed all planned crossings.

7. ***How can we access crossings on major highways, railroads and private land?***
   Depending on the scope of your surveys, you should have easy access to stream crossings on most public roads, though it is important to be aware of the right-of-way to avoid inadvertently trespassing on private land. Access to interstate highways and railroads is generally much more limited. For cases with limited access to crossings, you are responsible for contacting the appropriate owner or manager of those crossings to request access to conduct surveys. Similarly, for crossings on private roads, you should make concerted efforts to notify private landowners to request permission to conduct surveys on their lands. It may help to work with a local land trust, town or county governments, or state resource agencies to gain access from these landowners, as they often have similar needs for conducting habitat surveys or other resource assessments. In some survey efforts, when allowed by specific laws in effect in those jurisdictions, it has been considered permissible to survey crossings on private roads, particularly if good faith efforts to notify landowners have been undertaken first, or so long as crossings are not on posted or gated roads.

8. ***How can we be sure our data will lead to crossing improvements?***
   For your data to be useful in setting stream restoration priorities, we encourage you to collect data as completely and accurately as possible and ensure that the data are entered properly into the database. Finally, be sure that all data, including survey forms and site photographs, whether collected digitally or on paper, are transmitted to your state or regional coordinator for archiving.

SAFETY

Streams can be hazardous places, so take care to sensibly evaluate risks before you begin a survey at each stream crossing. While these efforts to record data about crossings are important, they are not nearly as important as your safety and well-being. Working around roads can be dangerous, so be sure to wear highly visible clothing, preferably safety vests in bright colors with reflective material; some vests have the additional bonus of containing many pockets to hold gear. Take care when parking and exiting your vehicle, and when crossing busy roads.

These surveys are best undertaken by teams of two people. This will facilitate taking measurements, making decisions in challenging situations, and recording data.

Take measurements seriously and carefully, but make estimates if necessary for your safety. Avoid wading into streams – even small ones – at high flows and entering pools of unknown depths, and take care scaling steep and rocky embankments. There are usually ways to effectively estimate some dimensions without risk. For example, an accurate laser rangefinder is a safe way to measure longer distances when conditions are unsafe, such as measuring culvert lengths through them instead of across busy roads.

Stream crossing inventory work may place NAACC observers in situations where they inadvertently contribute to the spread of aquatic invasive species (AIS), particularly when they cross watershed boundaries. AIS are harmful non-native plants, animals, and microorganisms living in some aquatic habitats that damage ecosystems or threaten commercial, agricultural, and recreational activities. The following best management practices are recommended for NAACC observers to prevent the spread of AIS between drainage basins.

AVOIDING THE SPREAD OF INVASIVE SPECIES

Stream crossing inventory work may place NAACC observers in situations where they inadvertently contribute to the spread of aquatic invasive species (AIS), particularly when they cross watershed boundaries. AIS are harmful non-native plants, animals, and microorganisms living in some aquatic habitats that damage ecosystems or threaten commercial, agricultural, and recreational activities. The following best management practices are recommended for NAACC observers to prevent the spread of AIS between drainage basins.

Survey planning:

- Complete surveys of HUC12 watersheds one at a time. Staying within a HUC12 rather than changing sub-basins can help stop the spread of invasive species.
- Whenever possible, start surveying stream crossing sites at the upstream end of a HUC12 watershed and progress downstream over the course of the day. Invasive species are naturally moved downstream by streamflow but do not easily move upstream on their own. By progressing from upstream to downstream in surveys, observers can avoid helping move invasive species to upstream locations.
- Do not use waders with felt soles.
- In waters known to contain invasive species, try to avoid entering the stream to take measurements. This may not be possible at many sites but could be at some.

Between site surveys:

- Before leaving a survey site, clean, drain, and dry (or treat) equipment. Clean equipment by inspecting it for attached mud, plants, and debris. Remove and dispose of anything found. Scrub equipment with a stiff brush and rinse with water. Drain any standing water in waders and other equipment.
- Keep a plastic drum filled with bleach or quaternary ammonia solution (which is less harmful on gear than bleach) in the back of the vehicle and put the wading boots in the drum while driving to the next site.
- When survey schedules or logistics prevent cleaning and drying/treating of equipment, a set of duplicate wading boots are recommended when observers change watershed boundaries during a single day. Observers should change into dry boots before surveying crossings in new watersheds and cycle the previous pair to be clean and dry for the following day.

At the end of the day, or when moving between HUC12 watersheds, use one of these options:

- Dry equipment completely for at least 48 hours. Preferable ways to dry equipment include direct sunlight, a heated garage, or a boot drying device such as a PEET Dryer device.
- Soak or spray equipment with a mild bleach solution (1 Tbsp bleach per gallon of water) for 10 minutes. The bleach solution must be mixed daily to maintain its effectiveness after 24 hours.
- Visit a "wader wash" station, if available.
- Freeze equipment for 6-8 hours.

EQUIPMENT

To collect data on stream crossing structures, you will need several essential pieces of equipment for measuring and recording, and some other items to keep you healthy and safe:

- ✓ **Instruction Guide for the NAACC Stream Crossing Survey Data Form** (this document)
- ✓ **Measuring Implements** in feet and tenths (decimal feet rather than inches)
  - **Reel Tape:** For measuring structure lengths and channel widths; 100 feet.
  - **Pocket Tape:** Best in 6 foot "Pocket Rod" version with no spring to rust.
  - **Stadia Rod:** Telescoping, 13 feet long to measure structure dimensions such as water depth.
- ✓ **Safety Vests:** Brightly colored, reflective vests, preferably with lots of pockets to hold equipment, but most importantly to be seen on the road.
- ✓ **Waders or Hip Boots:** To stay dry, insulate from cold water, minimize abrasions, and allow access to tailwater pools and deeper streams**.**
- ✓ **Flashlight:** To be able to see features inside long dark structures.
- ✓ **Rangefinder** (optional): To safely take measurements without crossing structures, busy roadways or streams; should be accurate to within one foot for adequate data accuracy.
- ✓ **Sun Protection:** Hat, sunglasses, and sunscreen as needed.

- ✓ **Insect Repellent:** To protect from annoying or dangerous bites.
- ✓ **First Aid Kit:** To deal with any minor injuries, cuts, scrapes, etc.
- ✓ **Cell Phone:** In case of emergency, to coordinate surveys, or to ask questions of coordinators.

For Paper Surveys

- ✓ **Stream Crossing Survey Forms**: Best printed on waterproof paper. Bring along more than you expect to use. Even digital surveys should include these in case a digital device becomes inoperable.
- ✓ **Clipboard**, **Pencils & Erasers**
- ✓ **Stream Crossing Maps**: For planning sites to survey, and for recording sites assessed, a *DeLorme Atlas and Gazeteer* or similarly accurate and updated set of maps with topography is helpful for navigation.
- ✓ **GPS Receiver**: Set GPS to collect data in WGS84 datum, with Latitude and Longitude in decimal degrees.
- ✓ **Digital Camera**: Best if waterproof and shockproof, with sufficient battery power for a full day of surveying, and capable of storing approximately 100 low to moderate resolution images (approximately 100 - 500 kilobyte stored size, generally less than 1 million pixels–1 megapixel). Include batteries or battery charger, and download cable. A backup memory chip can be very useful to have on hand.

For Digital Surveys:

- ✓ **Tablet Computer:** Should be waterproof, and preferably shockproof, to be able to survive wet and rugged field conditions. Various mapping applications can be run to allow navigation to planned survey sites, replacing paper maps. For more information on this method of survey, refer to the NAACC Digital Data Collection User's Guide available at https://www.streamcontinuity.org/resources/naacc_documents.htm
- ✓ **GPS Receiver:** If not integral to the tablet computer, an external GPS device will be needed either to connect to the tablet via Bluetooth or wire, or at the least, to be able to provide correct coordinates for entering to the tablet manually.
- ✓ **Stream Crossing Survey Forms**: As a backup in case digital devices fail.

UNMAPPED SITES AND NONEXISTENT CROSSINGS

Survey teams may encounter unmapped crossings, or it may be unclear whether a crossing they have found in the field is on their map because its location does not match the map. In most cases, the surveyed crossing should be within 100-200 feet of the planned crossing. Survey teams also may encounter unmapped crossings because either the road was not mapped, as in the case of a road built to serve a new housing development, or because of an error in the road or stream data.

If there is no planned crossing near the site you are assessing, you need to assign a temporary *Crossing Code* to that crossing. A *Crossing Code* is composed of the prefix "xy" followed by the latitude and longitude of the site, with decimal degree latitude and longitude values as seven-digit numbers. For instance, a crossing located at 42.32914 degrees north and -72.67522 degrees west, will have the resulting *xy code* = "xy42329147267522," followed by the notation: "NEW XY" to indicate that this crossing site must be added to the map.

Conversely, a crossing may exist on the map but not in the field. If you try to navigate to a site and are certain that there is no crossing in the vicinity, you should select the "No Crossing" option for *Crossing Type* on the field data form. Some crossings may not actually exist due to errors in generating the crossing points. Another possibility is that there may have been a road crossing there at one time, but the crossing has been removed, but may still need to be surveyed to note passage problems. For these sites, you will select the "Removed Crossing" option. Similarly, sometimes an entire stream reach has been moved, particularly underground, in which case you will select the "Buried Stream" *Crossing Type*.

In all cases where a survey crew either cannot locate a mapped crossing or intends to add a new unmapped crossing, it is essential to check the location carefully to minimize navigation and data collection errors.

COMPLETING THE SURVEY DATA FORM

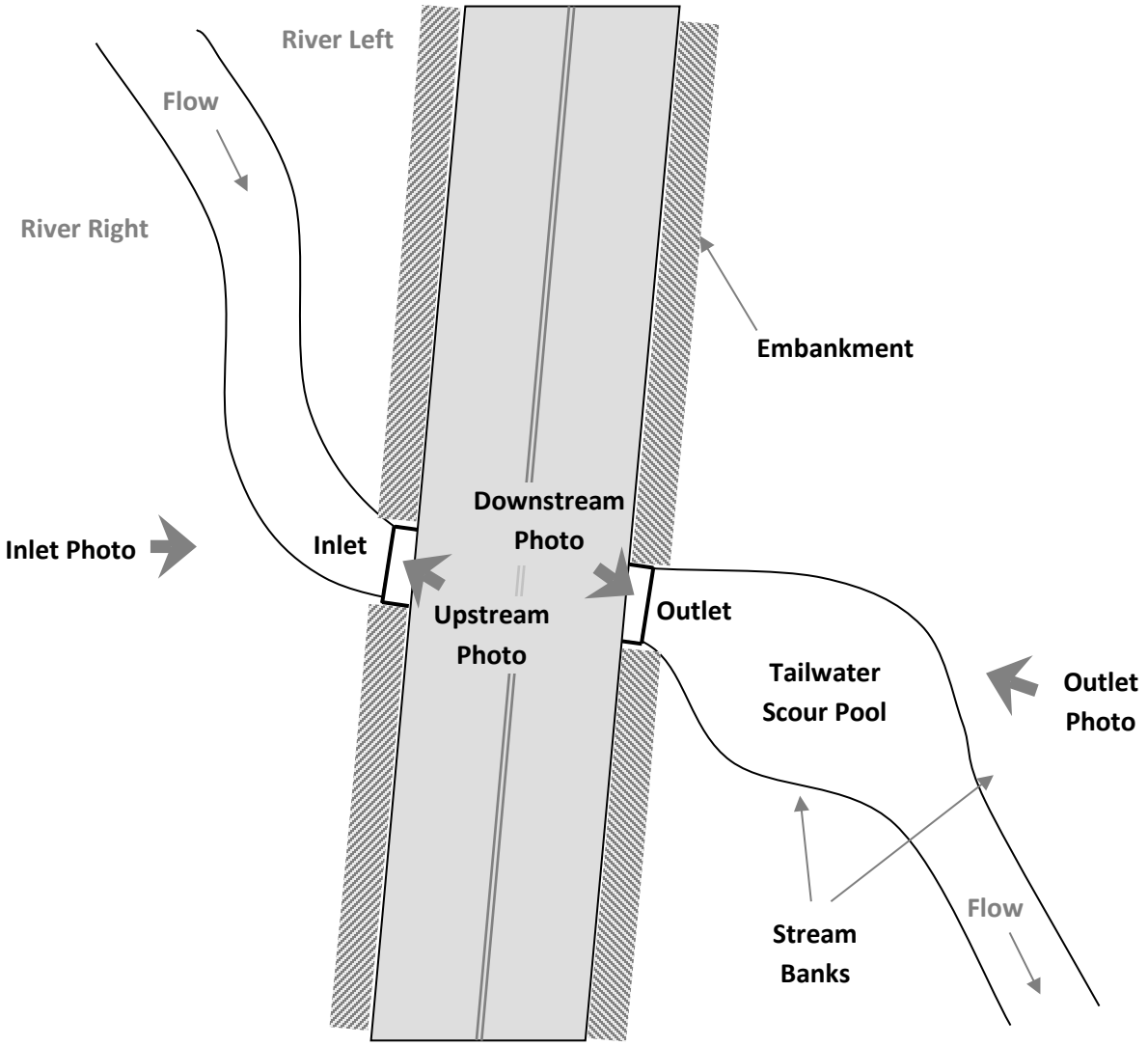
N/A

SHADED BOXES

The shading on the data form is intended to make the form easier to follow and complete. The different shading sets off elements related to certain groups of information from others.

SITE IDENTIFICATION

While each crossing will be different from others in its details, many common features will be assessed, measured, or otherwise observed during all surveys. The diagram below contains the basic terminology for key stream crossing features in a simplified overhead view.



UNDISTURBED STREAM REFERENCE REACHES

When conducting crossing surveys, elements of this data form require you to understand key characteristics of an undisturbed, "natural" section of the stream (called a *reference reach*) near where the crossing is located. These characteristics include the stream's approximate width, depth, and velocity, and the type of substrate that predominates there. In general, you will need to go a distance upstream or downstream from the crossing that is between 10 and 20 times the width of the stream to get away from the influence of the crossing. This means for a 10-foot wide stream, you will need to go between 100 and 200 feet upstream or downstream from the crossing to find an undisturbed reach. The distance will be much larger for larger streams. Note that sometimes you will be unable to locate such a reference reach, either because upstream and downstream reaches are too disturbed or modified, or because access is limited, such as by *No Trespassing* signs.

CROSSING DATA

Complete this section for the entire crossing. Choose only one option for the fields with checkboxes in the crossing data section.

N/A

Crossing Code: This is the 18-character "xy code" assigned to each planned survey crossing on survey maps. Be very careful to record the correct numbers, as they represent the precise latitude and longitude of the planned crossing, which can be compared with the actual location you record as GPS Coordinates below.

Local ID: Optional field for a program's own coding systems. Does NOT replace the Crossing Code.

Date Observed: Date that the crossing was evaluated, following the form *M/D/Y*.

Lead Observer: The name of the survey team leader responsible for the quality of the data collected.

Town/County: The town or county in which the assessed crossing is located according to the map.

Stream: The name of the stream taken from the map, or if not named on the map, the name as known locally, or otherwise list as *Unnamed*.

Road: The name of the road taken from the map or from a road sign. Numbered roads should be listed as "Route #", where # is the route number, with multiple numbers separated by "/" when routes overlap at the crossing (e.g., "Route 1/95"). For driveways, trails, or railroads lacking known names, enter *Unnamed*.

Road Type: Choose only one option:

Multilane: > 2 lanes, including divided highways (assumed paved)
Paved: public or private roads
Unpaved: public or private roads
Driveway: serving only one or two houses or businesses (paved or unpaved)
Trail: primarily unpaved, or for all-terrain vehicles only, but includes paved recreational paths
Railroad: with tracks, whether or not currently used

GPS Coordinates: Latitude and Longitude in decimal degrees to 5 decimal places. Use of a GPS (Global Positioning System) receiver is required, but your smart phone or tablet computer may include this capability.

Map Datum: It is best to use *WGS84* datum.

Location Format: Use Latitude-Longitude decimal-degrees (often in GPS menu as "hddd.ddddd").

You should stand above the stream centerline, and ideally on the road centerline, when taking the GPS point, but use your judgment and beware of traffic.

Location Description: If there is any doubt about whether someone could find this crossing again, provide enough information about the exact location of the crossing so that others with your data sheet would be confident that they are at the same crossing that you evaluated. For example, the description might include

"between houses at 162 and 164 Smith Road," "across from the Depot Restaurant," or "driveway north of Smith Road off Route 193." This information could also include additional location information, such as a site identification number used by road owners or managers.

Crossing Type: If a crossing is found at the planned location, choose the one most appropriate option.

Bridge: A bridge has a deck supported by abutments (or stream banks). It may have more than one cell or section separated by one or more piers, in which case enter the number of cells to *Number of Culverts/Bridge* Cells. Enter data for any additional cells in *Structure 2 Data*, *Structure 3 Data*, etc.

Culvert: A culvert consists of a structure buried under some amount of fill. If it is a single culvert, you need only complete the first page of the data form.

Multiple Culvert: If there is more than one culvert, you must indicate that in *Number of Culverts/Bridge Cells* to the right. Data must be entered in sections for additional structures starting on the second page (*Structure 2 Data*, *Structure 3 Data*, etc.). Count ALL structures, regardless of their size.

Ford: A ford is a shallow, open stream crossing, in which vehicles pass through the water. Fords may be armored to decrease erosion, and may include pipes to allow flow through the ford (*vented ford*).

If a planned crossing cannot be found or surveyed, the site will fit one of the following types:

No Crossing: There is no crossing where anticipated, usually because of incorrect road or stream location on maps. No further data is required. (Be sure you are in the correct location.)

Removed Crossing: A crossing apparently existed previously at the site but has been removed, so the stream now flows through the site with no provision for vehicles to cross over it. Continue to complete the survey form to the extent possible. Include information in Crossing Comments to explain your observations. For instance, indicate if an old culvert pipe is seen at the site, or if removal of the previous crossing structure left the stream with problems for aquatic organism passage.

Buried Stream: The planned crossing site does not include an inlet and/or outlet, likely because a stream previously in this location has been rerouted, probably underground. In this case, survey is not possible, and no further data is required.

Inaccessible: Survey is not possible because roads or trails to the crossing are not accessible. This may be due to private property posting, gates, poor condition, or other factors. Record in Crossing Comments why the site is inaccessible. No further data is required.

Partially Inaccessible: Use this option when you can access a crossing well enough to collect some but not all required data. This is most likely to occur when you cannot access either the inlet or outlet side of a crossing and cannot reasonably estimate the dimensions or assess things like inlet grade, outlet grade, scour pool or tailwater armoring.

No Upstream Channel: This option is for places where water crosses a road through a culvert but no road-stream crossing occurs because there is no channel up-gradient of the road. This can occur at the very headwaters of a stream or where a road crosses a wetland that lacks a stream channel (at least on the up-gradient side).

Bridge Adequate: Coordinators have the option of using this classification for large bridges for which it is obvious that they present no barrier to aquatic organism passage. Observers may collect and enter data for these crossings but these data are not required.

AKA "Number of Barrels"

Number of Culverts/Bridge Cells: For all Bridges with multiple sections or cells, and for all multiple culverts, you must enter the number of those cells or culvert structures here.

Photo IDs: All surveys should include a minimum of four digital photos of the following: crossing inlet, crossing outlet, stream channel upstream of crossing, and stream channel downstream of crossing. These photos are

immensely useful in setting priorities for restoration. Note that photos of buried streams are optional but recommended.

It is essential that all photos be associated with the correct crossing. If you take photos with a digital camera (and sometimes when using a smart phone or tablet computer), you should record the photo numbers assigned by the camera on the survey form in the space for each photo perspective. To record the correct photo numbers from any camera, each person taking photos must be familiar with the numbering system of the camera used. Record the ID number of each photo in the blanks on the data form.

While you may take multiple photos at a site in order to choose the best ones later, you must record on the data form the ID numbers of all photos taken at the site. It can be very helpful to have one or more additional photos, especially when important characteristics are not captured on the four required photos. For instance, if there is extreme erosion at the site, or if other aspects of the crossing make it a likely barrier to connectivity, it is useful to capture these with one or two additional photos.

A simple way to know which photos were taken at a particular site is to use a black marker on a white dry-erase board to record the date and Crossing Code, and to have the first photo at the crossing show this white board displaying the date and Crossing Code. The white board should be strategically placed in the photo so that it is legible and does not block key features of the crossings. This will make the photo readily identifiable with the appropriate crossing. Some people have noted that white dry-erase boards and white paper reflect so much light that they are often "washed out" in the photos, making the codes written on the board impossible to read; use of a small blackboard and chalk may be preferable depending on light conditions.

Another option for keeping track of photos is to make the first photo at each site an image of the field data sheet with the xycode and location information. All other photos of that crossing should immediately follow the photo of data form (with the xycode). It is important to remember to photograph the data form first, before you take any other photos for each crossing. Otherwise, you risk mixing up photos from different crossings.

Here are several additional tips for taking useful photos:

- Always include more than just the structure or stream area you are photographing; it is better to capture more context. Remember that with digital photos, we can zoom in to see detail.
- Including a stadia rod in photos of the inlet and outlet can be valuable to verify some measurements, and as a general reference for scale.
- When available, use a date/time stamp to code each photo.
- Set your camera to record in low to medium resolution so that the photos do not take up too much space on the memory card and when downloaded for storage. To minimize storage space but still allow a reasonable quality image, each photo should be between 100 and 500 kilobytes in size when downloaded. This often equates to a camera resolution setting of "1 Megapixel."
- Review photos at the site to discard bad photos and to be sure all perspectives are well represented.
- If you haven't used the camera before, practice to be sure you know how to take photos in dark or mixed light situations, as these often exist when surveying stream crossings.

The following are some examples of useful photos:

	Site 1	**Site2**	**Site 3**
Inlet			

Outlet



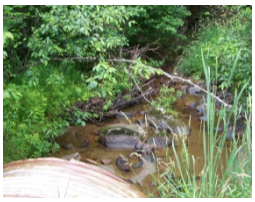


Upstream





Downstream


Flow Condition: Check the appropriate box to indicate how much water is flowing in the stream. Normally, the value selected for the first perennial crossing of the day will hold for all perennial sites in the area during that day, unless a rainfall event changes the situation. Choose only one option.

No Flow: No water is flowing in the natural stream channel; this option is typical of extreme droughts for perennial streams, or frequent conditions for intermittent or ephemeral streams.

Typical-Low: This is the most commonly used and expected value for surveys conducted during summer low flows, particularly on perennial streams. Water level in the stream will typically be below the level of non-aquatic vegetation, exposing portions of stream banks and bottom.

Moderate: This value is selected when recent rains have raised water levels at or above the level of herbaceous (non-woody) stream bank vegetation.

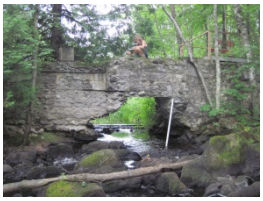
High: This value is selected only rarely, when flows are very high relative to stream banks, making crossing surveys very difficult or impossible, normally due to very recent, or ongoing major rain events. Avoid surveying crossings under high flows as data will not reflect more frequent flow conditions.

Crossing Condition: Check one box that best summarizes the condition of the crossing, based on your observations of the overall state or quality of the crossing, including all structures, particularly the largest or those carrying most of the flow. We are primarily trying to identify crossings in immediate danger of failing or in imminent need of replacement, as well as those that have been very recently installed. Focus primarily on the condition of structure materials.

OK: This is the value given to the vast majority of crossings. Many crossings have deficiencies such as surface rust, dents, dings, or cracks which do not indicate risk of failure.

Poor: This value is intended for structures where the material appears to be failing, such as metal culverts with rot (not just surface rust), or concrete, stone or wooden structures that are already collapsing, or in danger of immediate failure (see images below as examples).



New: This value is assigned only to a crossing that has been installed very recently. Look for unblemished structures with new riprap and/or vegetative bank stabilization.

Unknown: This value applies to all sites where the condition of the crossing cannot be assessed, such as when submerged.

N/A

Tidal Site: Sites in tidal areas will often require additional survey to fully assess aquatic organism passage. This element is primarily meant to identify sites in a tidal zone. Choose only one option. Survey of tidal crossings is best done within one hour of low tide to improve access and provide the most useful data. Freshwater streams influenced by tides, often at great distances from the ocean, are more difficult to identify. Coordinators working in such areas should provide Lead Observers with guidance on survey of such sites.

Yes: Evidence shows that tidal waters regularly reach the crossing site. Evidence includes a clear wrack line (line of debris) marking the limit of recent tides. Other indications include observation of salt marsh plants (*spartina spp.*, not upland vegetation or freshwater wetland plants like cattails and common reed (*phragmites*), though both of these wetland plants *can* exist on the fringes of salt marshes) in the vicinity.

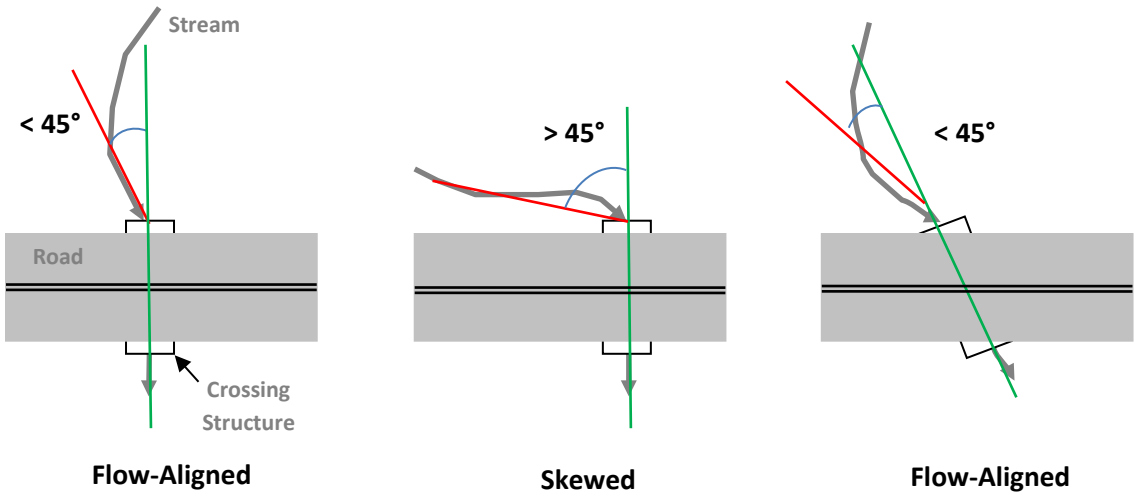
No: Sites are not tidal if downstream banks obviously contain plants that could not survive salt water inundation, such as alders, maples, ferns, etc., normally seen on stream banks in upland areas.

Unknown: Select when unsure of whether a crossing is in a tidal zone.

Alignment: Indicates the alignment of the crossing structure(s) relative to the stream at the inlet(s). Compare the crossing centerline (green lines below) to a centerline of the stream where it enters the crossing (red lines below).

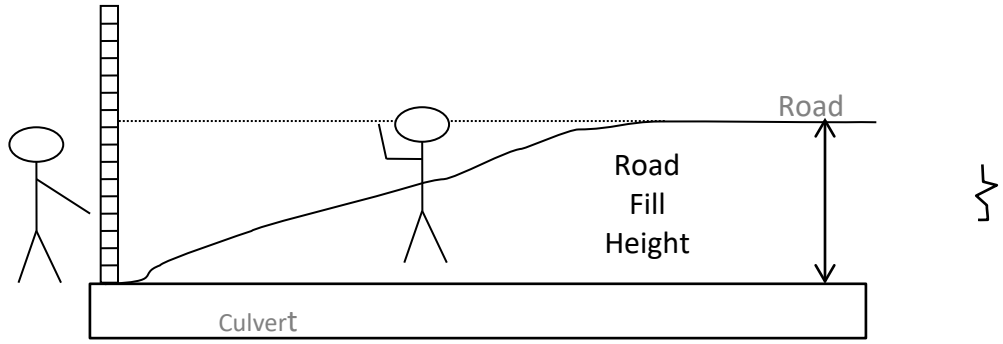
Flow-Aligned: The stream approaches the crossing at less than a 45 degree angle from the centerline.

Skewed: The stream approaches the crossing structure(s) at an angle greater than 45 degrees from the centerline. Note that for some crossings the centerline is not perpendicular to the road.



AKA "Crossing Alignment to Stream"

Road Fill Height: Within 1 foot, measure the height of fill material between the top of the crossing structure(s) and the road surface. This is best measured with two people when the road surface or fill height is above a surveyor's height, with one person holding a stadia rod, and the other sighting the elevation of the road surface from the side (see diagram below). For multiple culverts with differing amounts of fill over them, provide an average fill height.



Collected in-field, use Stream Stats as part of design phase

Bankfull Width (optional measurement)**:** This is a measure of the active stream channel width at bankfull flow, the point at which water completely fills the stream channel and where additional water would overflow into the floodplain. Estimates of the frequency of bankfull flows vary, but they may happen as often as twice a year, or only once every one or two years. Each state or regional coordinator will define whether or not you should measure bankfull width in your surveys. When done with high confidence (see next metric), bankfull width can be an extremely useful measurement, but it can be difficult and time consuming, and it will not be possible for all surveyors and sites (even with experienced surveyors). The first step is to identify bankfull flow indicators in an undisturbed reach, and the second step is to measure the width from bank to bank at those locations. Indicators of bankfull flow (shown in the photographs below as the red line) include[1]:

Abrupt transition from bank to floodplain: The point of change from a vertical bank to a more horizontal surface is the best identifier of bankfull stage, especially in low-gradient meandering streams.

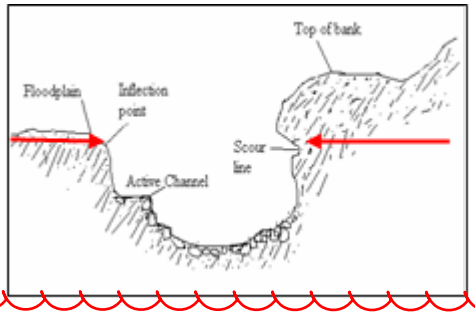




Top of point bars: The point bar consists of channel material deposited on the inside of meander bends. Set the top elevation of point bars as the lowest possible bankfull.



Bank undercuts: Maximum heights of bank undercuts are useful indicators of bankfull flow in steep channels lacking floodplains.

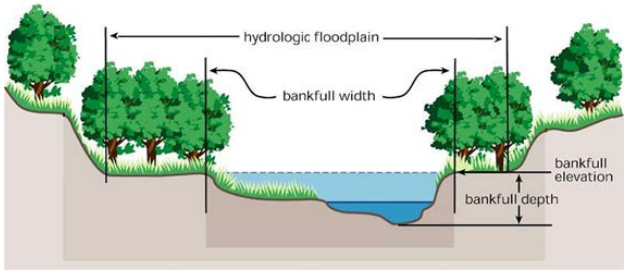


[1] Adapted from Georgia Adopt-A-Stream "Visual Stream Survey" manual. Georgia Department of Natural Resources, 2002.

Changes in bank material: Changes in the particle size of sediment (rocks, soil, etc.) may indicate the upper limits of bankfull flows, with larger sediments exposed to more frequent channel-forming flows.



Change in vegetation: Look for the low limit of woody vegetation, especially trees, on the bank, or a sharp break in the density or type of vegetation.



Bankfull Width Confidence: This qualifies your assessment of Bankfull Width based on your experience with its measurement and whether sufficient criteria were met in your measurements. Choose only one option.

High: Select this option only when you are highly confident that your assessment of Bankfull Width meets the following criteria:

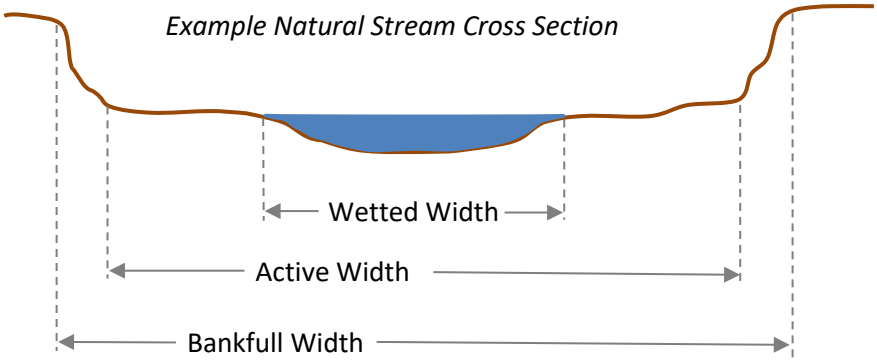
- Clear indicators are present to define the limits of Bankfull Width.
- The recorded value is an average of at least three measurements in different locations.
- All measurements of Bankfull Width were taken in undisturbed locations well upstream or downstream of the crossing.
- No tributaries enter between the crossing and your area(s) of measurements.
- No measures taken at stream bends, pools, braided channels, or close to stream obstructions.

Low/Estimated: Select this when **any** of the above criteria cannot be met.

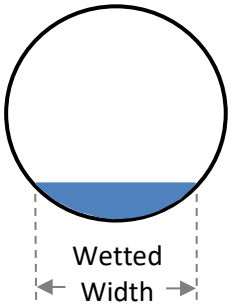
Constriction: Regardless of whether you measured Bankfull Width above, this element assesses how the width of the crossing (including all of its structures) compares to the width of the natural stream channel. Refer to the above section on determining Bankfull Width for reference. Two other ways of assessing the width of the natural stream channel consider the *active channel* and the *wetted channel*.

The *active channel* is the area of the stream that is very frequently affected by flowing water. The width of the *active channel* can often be very close to the Bankfull Width when stream banks are very steep. The *wetted channel* is simply the area of the stream that contains water at the time of survey, which may be significantly less than the *active channel*, depending on flow.

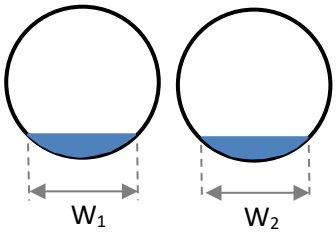
Refer to the general illustrations below, and check the appropriate description from the list below to assess how constricted the flow of the stream is by the crossing compared to either the *bankfull*, *active*, or *wetted* channel. Choose only one option.



Example Culvert Cross Section



Example Multiple Culvert Cross Section



Wetted Width = $W_1 + W_2$

Severe: The total width of the crossing (sum of widths of all crossing structures) is less than 50% of the bankfull or active width of the natural stream, or the total *wetted width* of the crossing is less than 50% of the wetted width of the stream.

Moderate: The crossing is *greater than* 50% of the bankfull or active width of the natural stream, but less than the full bankfull or active channel width.

Spans Only Bankfull/Active Channel: The crossing encompasses the approximate width of the bankfull or active channel.

Spans Full Channel & Banks: The crossing completely spans beyond the *Bankfull Width* of the natural stream, as often evidenced by banks within the crossing structure.

Tailwater Scour Pool: This is a pool created downstream of a crossing as a result of high flows exiting the crossing. Use as a reference natural pools in a portion of the stream that is outside the influence of the crossing structure. A scour pool is considered to exist when its size (a combination of length, width, and depth) is larger than pools found in the natural stream. Check *Large* if the length, width **or** depth of the pool is two or more times larger than of pools in the natural stream channel. Otherwise, check *Small* if the pool is between one and two times the length, width, **or** depth of pools in the natural channel.

None: There is no difference between the length, width, or depth of the tailwater pool compared with reference pools, or no tailwater pool exists at the site.

Small: The tailwater pool is between one and two times the length, width, or depth of reference pools.

Large: The tailwater pool is more than twice the length, width or depth of reference pools.

Crossing Comments: Use this area for brief comments about any aspect of the overall crossing survey that warrants additional information. Do not use this box for comments about particular structures; comment boxes for each structure are provided elsewhere on the form.

STRUCTURE DATA

Choose only one option for structure data fields **except** when identifying Internal Structures and Physical Barriers.

When there are multiple culverts and/or bridge cells, number them from left to right, while looking downstream toward the culvert inlet. The left-most structure is Structure 1, and structure numbers increase to the right. See examples below. When entering data via the ODM or data entry screen make sure that you enter the structures in the same order in which they are numbered.





For each structure, you will complete the following information.

Structure Material: Record here the primary material of which the structure is made, i.e., the material that makes up the majority of the structure. When in doubt, focus on the material that is most in contact with the stream. If a structure is made of two materials, such as a bridge with concrete abutments and a steel deck structure, a metal culvert that has been lined along its entire bottom with concrete, or a crossing with different types of structures at inlet and outlet, select *Combination*. Choose only one option.











Outlet Shape: Refer to the diagrams on the last page of the field data form, and record here the structure number that best matches the shape of the structure opening observed at the inlet of the culvert. This is usually simple, but when a shape seems unusual, you should carefully choose the most reasonable option from among the eight available. We collect this information to be able to find the "open area" inside the structure above any water or substrate, so the shape is vital to accurately calculate area. Choose only one option.

1 - Round Culvert: This is a circular pipe. It may or may not have substrate inside, even though the diagram on the field form shows a layer of substrate. It may be compressed slightly in one dimension, and should be considered round unless it is truly squashed so that it reflects a type 2 shape below.







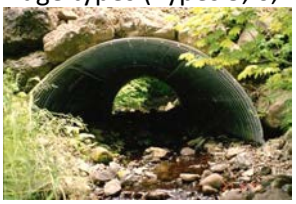


2 - Pipe Arch/Elliptical Culvert: This is essentially a squashed round culvert, where the lower portion is flatter, and the upper portion is a semicircular arch, or as on the right below, more of a pure ellipse. It may or may not have substrate inside (the diagram on the field form shows a layer of substrate).






3 - Open Bottom Arch Bridge/Culvert: This structure will often look like a round culvert on the top half, but it will not have a bottom. There will be some sort of footings to stabilize it, either buried metal or concrete footings, or concrete footings that rise some height above the channel bottom. There will be natural substrate throughout the structure. To distinguish between an embedded Pipe Arch Culvert and an Open Bottom Arch, note that the sides of the Pipe Arch curve inward in their lower section, while the sides of the Open Bottom Arch will run straight downward into the streambed substrate or to a vertical footing. Beware of confusion between an Open Bottom Arch and an embedded Round Culvert; Open Bottom Arches tend to be larger than most Round Culverts. This shape could also be selected for certain bridges that have a similar arched shape and are not well represented by other bridge types (Types 5, 6, 7, below).





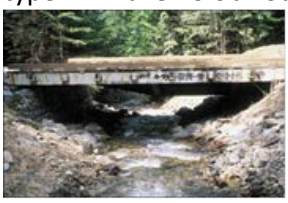

4 - Box Culvert: These structures are usually made of concrete or stone, but sometimes of corrugated metal with a slightly arched top. Typically, they have a top, two sides, and a bottom.

A box culvert <u>without</u> a bottom, called a bottomless box culvert, should be classified as a *Box/Bridge with Abutments* (#6, below). If you cannot tell if the structure has a bottom, classify it as a *Box/Bridge with Abutments* (#6). The images below show *Box Culverts* (#4).






5 - Bridge with Side Slopes: This is a bridge with angled banks up to the bottom of the road deck. This type will have no obvious abutments, though they may be buried in the road fill.






6 - Box/Bridge with Abutments: This is a bridge or bottomless box culvert with vertical sides.



7 - Bridge with Side Slopes and Abutments: This is a bridge with sloping banks and vertical abutments (typically short) that support the bridge deck. (Arrows below show the abutments.)



Ford: A ford is a shallow, open stream crossing that may have aminimal structure to stabilize where vehicles drive across the stream bottom. The arrows below indicate the length of a ford, to be measured as Dimension *L*, described below.



Unknown: Select when a structure's shape is unidentifiable for any reason. Typically, the inlet shape may be unidentifiable because it is submerged or completely blocked with debris.

Removed: Select when the structure is no longer present.

Outlet Armoring: Select from the options to indicate the presence and extent of material placed below the outlet for the purpose of diffusing flow and minimizing scour. The most common form of outlet armoring is riprap (angular rock) placed below the outlet. A few pieces of rock that may have fallen into the stream near the structure's outlet **do not** constitute outlet armoring. Armoring of the road embankment and stream banks should not be confused with armoring of the stream bottom at the outlet. Choose only one option.

Refer to the photos below for examples of each option.

None: This situation represents the majority of crossing structures. You may observe rocks that have fallen from the embankment or that are natural to the stream. Most cascades do not constitute armoring unless specifically put in place to minimize outlet scour.



Not Extensive: There is of a layer of material covering an area *less than 50% of the stream width* placed purposefully below the outlet specifically to minimize the effects of scour.

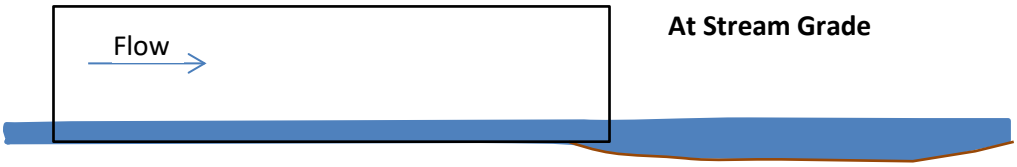


Extensive: Select this option only if you observe an extensive layer of material covering an area more than 50% of the stream width, which was put in place specifically to minimize scour at the outlet.



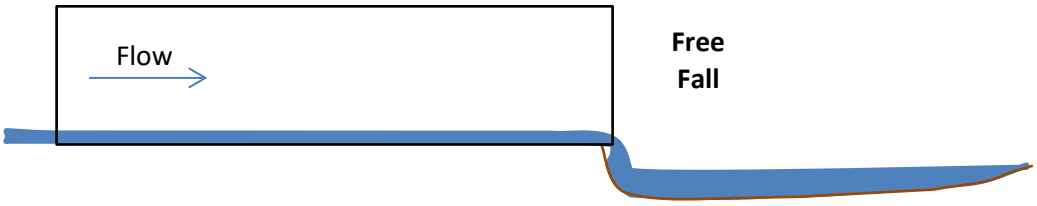
Outlet Grade: Outlet grade is an observation of the relative elevation of the structure to the streambed and how water flows as it exits the structure. This is not an assessment of stream slope (gradient).
Choose only one option.

At Stream Grade: The bottom of the outlet of the structure is at approximately the same elevation as the stream bottom (there may be a small drop from the inside surface of the structure down to the stream bottom), such that **water does not drop downward at all** when flowing out of the structure. Such outlets can normally be considered to be "backwatered" by the downstream stream bed.





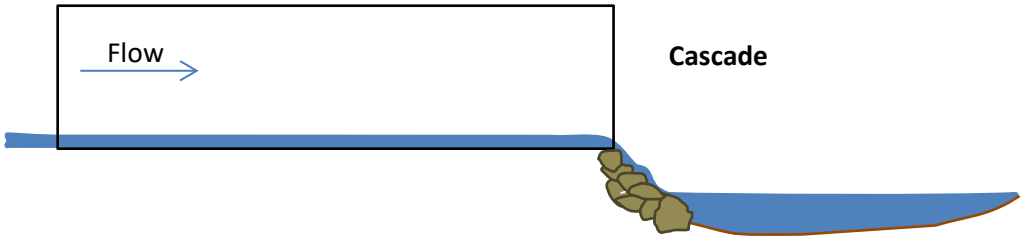
Free Fall: The outlet of the structure is above the stream bottom such that **water drops vertically** when flowing out of the structure.







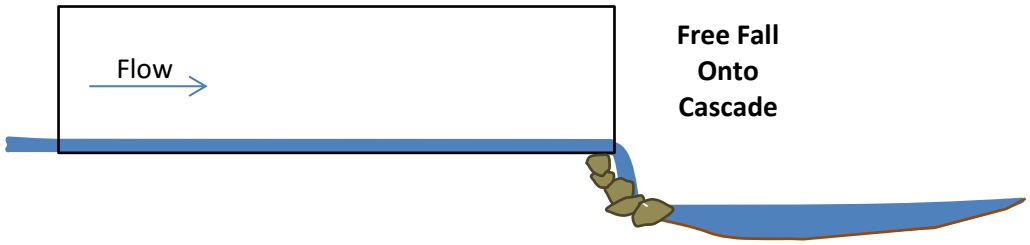

Cascade: The outlet of the structure is raised above the stream bottom at the outlet such that **water flows very steeply downward across rock or other hard material** when flowing from the structure. Think of this as series of small waterfalls at the outlet.








Free Fall Onto Cascade: The outlet of the structure is raised above the stream bottom at the outlet such that **water drops vertically onto a steep area of rock or other hard material, then flows very steeply downward** until it reaches the stream.








Clogged/Collapsed/Submerged: The structure outlet is either full of debris, collapsed, or completely underwater (not usually all three), making outlet measurements impossible. This may be found in places where beavers or sediment have plugged or inundated a structure so completely that water has backed up and covered the outlet, or where a crossing has collapsed to the point that it cannot be measured at its outlet. **Chose this option only if you are unable to collect data on outlet dimensions.**

Outlet Dimensions: **Four** measurements should be taken at the outlet and inside all structures, and an additional **two** should be taken for all structures with an Outlet Grade marked as *Free Fall, Cascade* or Free *Fall Onto Cascade*. The four measurements are shown on the diagrams on the last page of the field data form, and the others are illustrated below.

Dimension A, ***Structure Width***: To the nearest tenth of a foot, measure the full width of the structure outlet according to the location of the horizontal arrows labeled ***A*** in the diagrams. Take this measurement **inside** the structure.

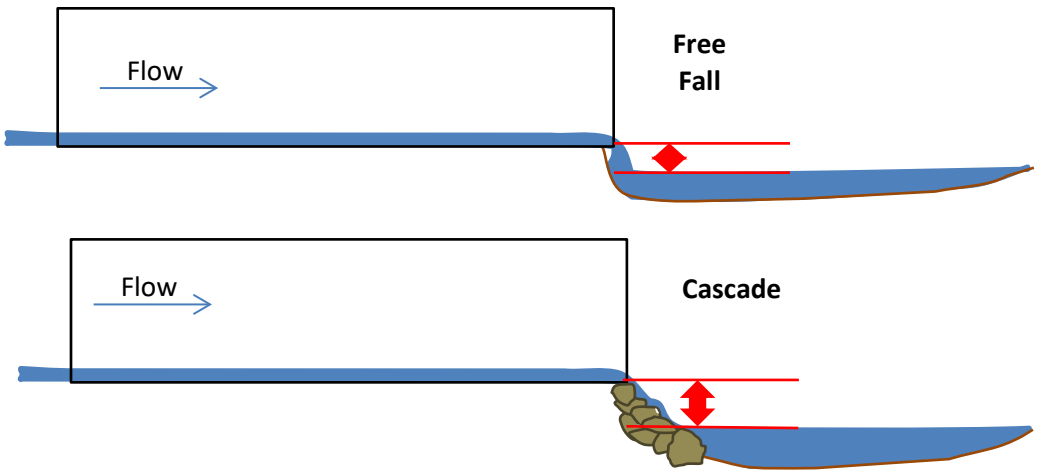
Dimension B, ***Structure Height***: To the nearest tenth of a foot, measure the height of the structure outlet according to the location of the vertical arrows labeled ***B*** in the diagrams. Take this measurement **inside** the structure. If there is no substrate inside, this will be the full height of a structure from bottom to top. If there is substrate inside, this will be the height from the top of the stream bottom substrate up to the inside top of the structure.

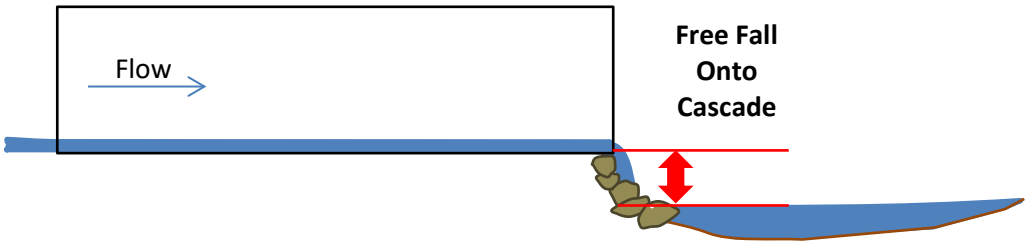
Dimension C, ***Substrate/Water Width***: To the nearest tenth of a foot, measure the width of **either** the substrate layer in the bottom of the structure, or of the water surface, whichever is **wider** according to the general location indicated by the arrows labeled ***C*** in the diagrams. This measurement must be taken **inside** the structure near the outlet. Some rules of thumb for Dimension C are below:

- When there is no substrate in a structure, measure only the width of the water surface.
- When there is no water in a structure, but there is substrate, measure the width of substrate.
- When there is no substrate or water in a structure, C = 0.

Dimension D, ***Water Depth***: To the nearest tenth of a foot (except when < 0.1 foot, to the nearest hundredth of a foot), measure the average depth of water in the structure at the outlet according to the location of the vertical arrows labeled ***D*** in the diagrams. This measurement must be taken **inside** the structure. When there are lots of different depths due to a very uneven bottom, take several measurements and record the average. For fords, measure the water depth at the downstream limit of the ford.

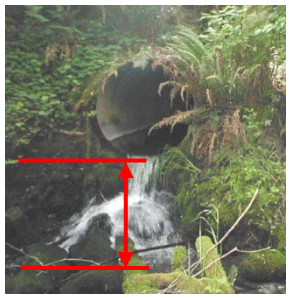
Outlet Drop to Water Surface: This measurement is only applicable to *Free Fall, Cascade* and Free *Fall Onto Cascade* outlets. To the nearest tenth of a foot, measure from the inside bottom surface of the structure (**not** the top of the water) down to the water surface outside the structure. For *Cascade* and *Free Fall Onto Cascade* structures, measure to the surface of the water at the bottom of the cascade. Refer to the diagrams and photos below for guidance; the red arrows indicate where to make this measurement. When assessing *At Stream* Grade structures or dry structures in streams without flow or water in an outlet pool, this measurement must be *zero*.





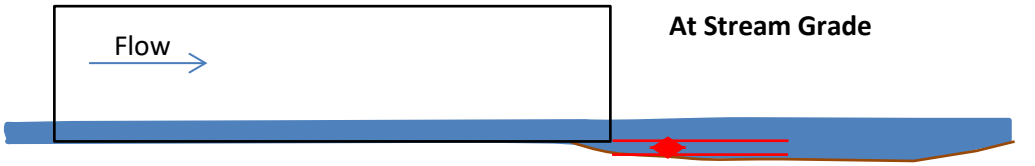

Free Fall

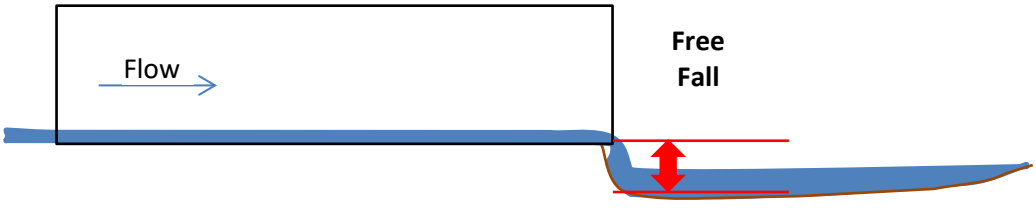

Free Fall

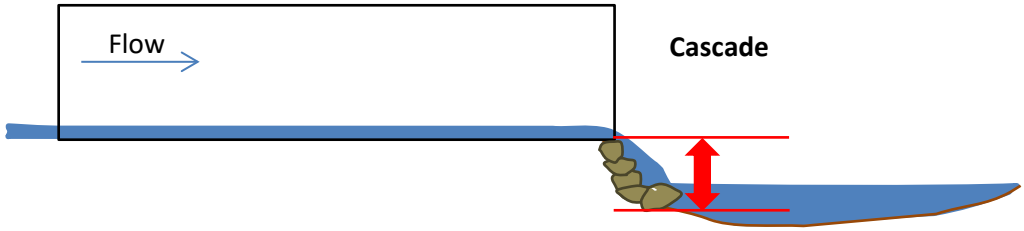


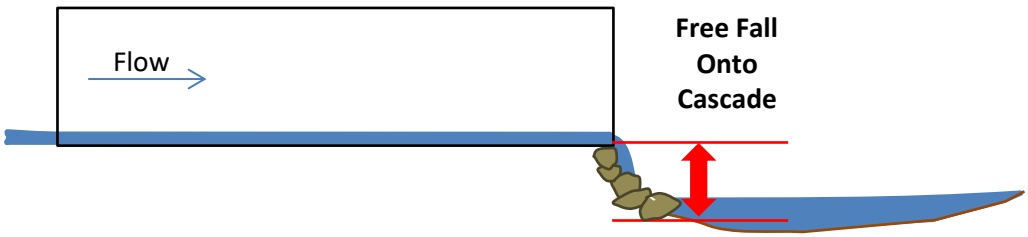

Free Fall onto Cascade

Outlet Drop to Stream Bottom: To the nearest tenth of a foot, measure from the inside bottom surface of the structure (**not** the top of the water) down to the stream bottom at the place where the water falls from the outlet. For At Stream Grade structures, this may be hard to measure, and may be a very small drop. For Cascade and Free Fall Onto Cascade structures, measure the full vertical drop to the stream bottom at the end of the cascade. Refer to the diagrams below for guidance.

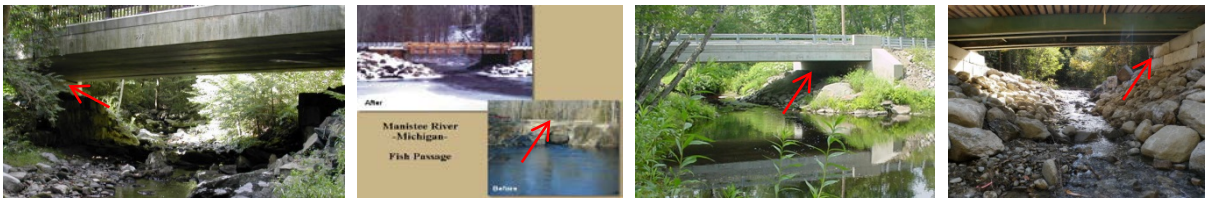




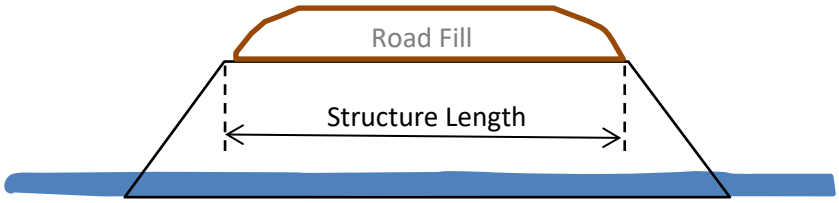




Abutment Height, *Dimension E*: This measurement is taken only when surveying a *Bridge with Side Slopes and Abutments* (#7 structure**)**. To the nearest foot, measure the height of the vertical abutments from the top of the side slopes up to the bottom of the bridge deck structure.

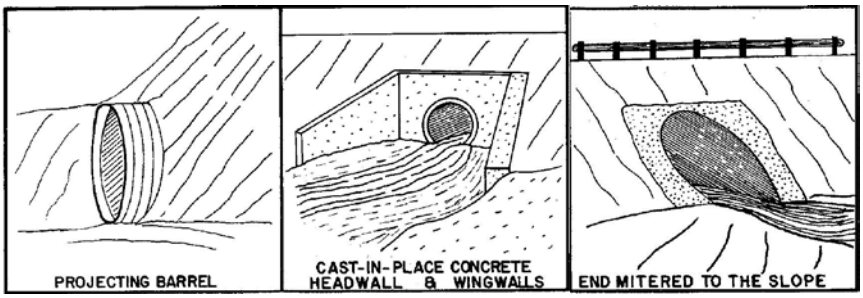


Structure Length, *Dimension L*: To the nearest foot, measure the length of the structure at its top.



Inlet Shape: Refer to the diagrams on the last page of the field data form, and record here the number that best matches the shape of the structure at its outlet. Refer to the instructions for **Outlet Shape** for examples and photos.

Inlet Type: Choose only one option for the style of a culvert inlet, which affects how water flows into the crossing, particularly at higher flows. The drawings here are meant as general guides, but refer to the photos below for more specific images of each type.



Projecting: The inlet of the culvert projects out from (is not flush with) the road embankment.






Headwall: The inlet is set flush in a vertical wall, often composed of concrete or stone.






Wingwalls: The inlet is set within angled walls meant to funnel water flow. These walls can be composed of the same material as the culvert, or different material. It is relatively rare to see wingwalls without a headwall.






Headwall & Wingwalls: The inlet is set flush in a vertical wall, and has angled walls to funnel flow.






Mitered to Slope: The inlet is angled to fit **flush with the slope of the road embankment**. Note that many mitered culverts project out from the embankment, and should be recorded as *Projecting*.






Other: There may be some other inlet characteristics that do not match any of the above types and which may limit flow into the culvert (but are not *Physical Barriers*), in which case select *Other*, and explain in *Structure Comments*.

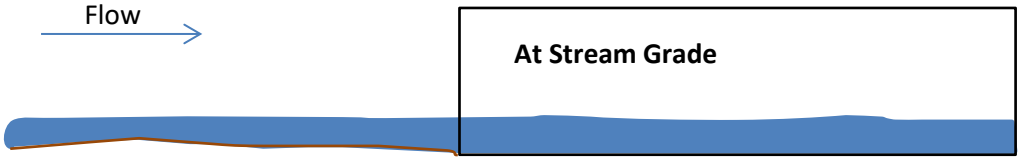
None: The inlet does not have any of the above features or characteristics.





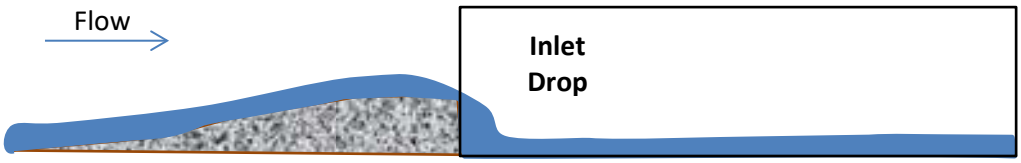

Inlet Grade: An observation of the relative elevation of the stream bottom as it enters the structure. This is not an assessment of stream slope (gradient). Choose only one option.

At Stream Grade: The inlet of the structure is at approximately the same elevation as the stream bottom upstream of the structure.



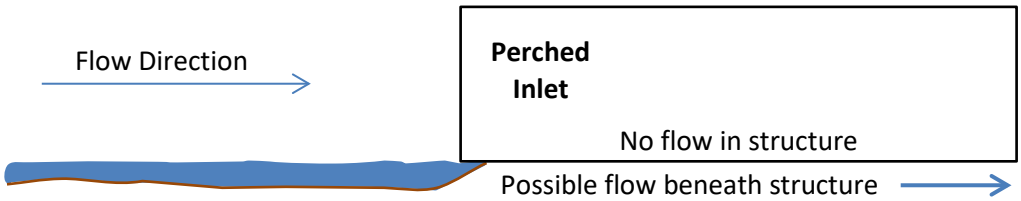


Inlet Drop: Water in the stream has a near-vertical drop from the stream channel down into the inlet of the structure. This usually occurs because sediment has accumulated above the inlet. The drop should be very obvious and not typical of natural drops in that stream. If there is a debris blockage or dam at the inlet, use **Physical** Barriers to record those features, and mark *At Stream Grade* here.



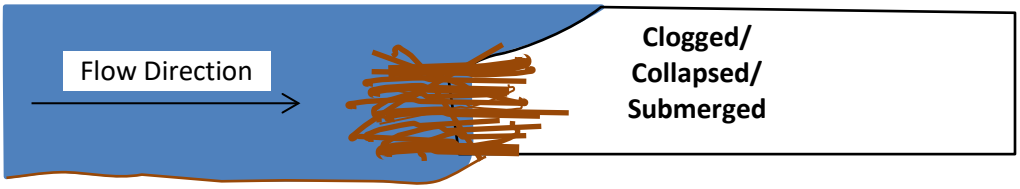


Perched: The inlet of the structure is set too high for the stream, and little water passes through the structure during normal low summer flows, though the stream has water upstream and downstream of the crossing. The structure inlet is above the surface of water in the stream. Water can enter the structure only at higher flows. This is a relatively rare condition, found mostly on very small streams. At such sites, there is generally water backed up above the inlet. In some cases water may be "piping" underneath the structure.





Clogged/Collapsed/Submerged: The structure inlet is either full of debris, collapsed, or completely underwater (not usually all three), making inlet measurements impossible. This may be found in places where beavers or debris have plugged a structure inlet so completely that water has backed up and covered the inlet, or where a crossing has collapsed to the point that it cannot be measured at its inlet. **Chose this option only if you are unable to collect data on inlet dimensions.**





Unknown: The inlet cannot be located or observed, or for some other reason you cannot determine the *Inlet Grade*, or take any inlet measurements.

Inlet Dimensions: There are four basic measurements to take at the inlet and outlet of each structure; these four measurements are to be made inside the structure. These are shown on the diagrams on the last page of the field data form.

Dimension A, ***Structure Width:*** To the nearest tenth of a foot, measure the full width of the structure inlet according to the location of the horizontal arrows labeled ***A*** in the diagrams. Take this measurement **inside** the structure.

Dimension B, ***Structure Height***: To the nearest tenth of a foot, measure the height of the structure inlet according to the location of the vertical arrows labeled ***B*** in the diagrams. Take this measurement **inside** the structure. This may be the full height of a culvert pipe if there is no substrate inside, or if there is substrate, it will be the height from the top surface of the substrate up to the inside top of the structure.

Dimension C, ***Substrate/Water Width***: To the nearest tenth of a foot, measure the width of **either** the substrate layer in the bottom of the structure, or the water surface, whichever is wider, according to the general location indicated by the arrows labeled ***C*** in the diagrams. Take this measurement **inside** the structure at the inlet. Some rules of thumb for Dimension C are below:

- When there is no substrate in a structure, measure the width of the water surface.
- When there is no water in a structure, but there is substrate, measure the width of substrate.
- When there is no substrate or water in a structure, C = 0.

Dimension D, ***Water Depth***: To the nearest tenth of a foot (except when < 0.1 foot, to the nearest *hundredth* of a foot), measure the average depth of water in the structure at the inlet according to the location of the vertical arrows labeled ***D*** in the diagrams. This measurement must be taken **inside** the

structure. When there are many different water depths due to a very uneven structure bottom, take several measurements and record the average. For fords, measure the water depth at the upstream limit of the ford.

N/A

Slope %*:* (Optional) Calculate or estimate the percent slope of the crossing from inlet to outlet by using one of several optional methods described below. Note that this measurement or estimate can be important to calculating the hydraulic capacity of the crossing, and is difficult to measure accurately without the proper tools. In general, the ease and accuracy of these different methods relates directly to the cost of the tools needed, with the most easy-to-use and accurate measurement tools costing more.

1) The simplest accurate method for measuring slope is to use an accurate laser rangefinder/hypsometer with a slope function, and to measure from inlet to outlet at the same height in relation to each invert. For instance, a person with a known eye height of 5.0 feet sights from one end of a culvert by standing on top of the inlet to the 5.0 foot mark on a stadia rod on top of the outlet. You must take at least three measurements and average them, and be sure the instrument is set to read in percent, not degrees.
2) Another method for measuring slope is to use an auto level or other accurate survey instrument to measure the vertical difference between inlet and outlet invert elevations, then dividing this number by the length of the structure, and multiplying by 100.
3) The next best approach is to use a clinometer that measures slope to the nearest half percent, measuring from a fixed point above one invert (inlet or outlet) to the same height above the opposite invert such as described above under method 1. Many clinometers include both percent and degree scales; be sure to use the percent scale.
4) Another less accurate approach is to sight from a fixed elevation above the inlet invert with a hand level to a stadia rod at the outlet invert, to take the difference in height between the two points, divide by the structure length, and multiply by 100.

Slope Confidence: Rate the confidence you have in your slope measurement or estimate according to the criteria below:

High: Used method 1 above, taking multiple measurements and averaging them, or used method 2 above.

Low: Used methods 3 or 4 above, taking multiple measurements and averaging them.

Internal Structures: Indicate the presence of structures inside the crossing structure. These may include baffles or weirs used to slow flow velocities and help to pass fish, as well as trusses, rods, piers or other structures intended to support a crossing structure, but which may interfere with flow and aquatic organism passage. See photos below for examples of internal structures. Choose any option(s) that apply.

None: There are no apparent structures inside the crossing structure.

Baffles/Weirs: Baffles (partial width) or weirs (full width, notched or not) are incorporated into the structure, either inside or at its outlet, to help aquatic organisms move through the structure.

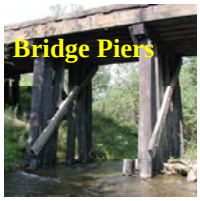
Supports: Some type of structural supports, such as bridge piers, vertical or horizontal beams, or rods apparently meant to support the structure, are observed inside the crossing structure.

Other: Structure(s) other than the categories above are present inside the crossing structure. Provide a very brief description of those structures here, or more fully describe them under **Structure Comments**. **Do not** include here items such as bedrock, material blockages, structural deformation, or inlet fencing to exclude beavers, which will be recorded below as **Physical Barriers**.





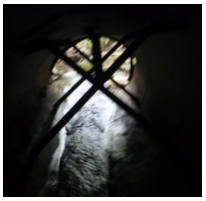












Structure Substrate Matches Stream*:* Choose only one option based on a comparison of the substrate (e.g., rock, gravel, sand) inside the structure and the substrate in the natural, undisturbed stream channel.

None: Select this option when there is very little (e.g., a thin layer of silt or a few pieces of rock) or no substrate inside the structure.

Comparable: The substrate inside the structure is similar in size to the substrate in the natural stream channel.

Contrasting: The substrate inside the structure is different in size from the substrate in the natural channel.

Not Appropriate: The substrate inside the structure is very different in size (usually much larger) than the substrate in the natural stream channel. Imagine turtles that typically move along a sandy stream trying to traverse an area of large cobbles, angular riprap or boulders (rarely observed).

Unknown: There is no way to observe if there is substrate inside the structure or what type it is. Select this option when deep, fast, or dark water or other factors do not allow direct observation.

Structure Substrate Type: Choose only one option from the table below to indicate the most common or dominant substrate type inside the structure. If you are certain that the structure contains substrate, but cannot assess the type, select *Unknown*. If there is no substrate in the structure, select *None*.

Substrate Type	Feet	Approximate Relative Size
Silt	< 0.002	Finer than salt
Sand	0.002 – 0.01	Salt to peppercorn
Gravel	0.01 – 0.2	Peppercorn to tennis ball
Cobble	0.2 – 0.8	Tennis ball to basketball
Boulder	> 0.8	Bigger than a basketball
Bedrock	Unmeasurable	Unknown - buried

Structure Substrate Coverage: Choose one option, based on the extent of the substrate inside the crossing structure as a ***continuous*** layer across the entire bottom of the structure from bank to bank (side to side).

None: Substrate covers less than 25% of the length of the structure, or there is no substrate inside the structure at all.

25%: Substrate covers *at least* 25% of the length of the structure.

50%: Substrate covers *at least* 50% of the length of the structure.

75%: Substrate covers *at least* 75% of the length of the structure.

100%: Substrate forms a ***continuous*** layer throughout the ***entire*** structure.

Unknown: It is not possible to directly observe whether substrate forms a continuous layer on the structure bottom.

Physical Barriers: Select any of these barrier types in or associated with the structure you are surveying, but do not include here information already captured in **Outlet Grade**. Note here additional barriers, including those associated with Inlet Grade or blockages, or Internal Structures. If a barrier feature affects more than one structure at a crossing (e.g., a beaver dam), include it for all affected structures. Refer to the photos below for examples of physical barriers.

Note that some structures have a combination of physical barriers. Check all that apply.

None: There are no physical barriers associated with this structure aside from any already noted in **Outlet Grade**.

Debris/Sediment/Rock: Woody debris or synthetic material, rock, or sediment blocks the flow of water into or through the structure. This can consist of wood or other vegetation, trash, sand, gravel, or rock. Do not check this option if you observe only very small amounts of debris that are likely to be washed away during the next rain event. Also, do not confuse sediment inside a structure that constitutes an appropriate stream bed with an accumulation that limits flow or passage of organisms.







Deformation: The structure is deformed in such a way that it significantly limits flow or inhibits the passage of aquatic organisms. This does not include minor dents and slightly misshapen structures.






*Free Fall***:** In addition to its **Outlet Grade**, which may include a *Free Fall*, the structure has one or more **additional** vertical drops associated with it. These may include a dam at the inlet, a vertical drop over bedrock inside the structure, or some other feature likely to inhibit passage of aquatic organisms. Note that a *Free Fall* inside a structure is often more limiting than similar size drops found in an undisturbed natural reach of the same stream which occur where there may be multiple paths for organisms to follow. A *Free Fall* can exist because of a debris blockage, so both physical barriers would be recorded.






Fencing: The structure has some sort of fencing, often at the inlet to deter beavers. Depending on the mesh size of that fencing, it may directly block the movement of aquatic and terrestrial organisms, and it may become clogged with debris. If also blocked with debris, be sure to check *Debris/Sediment/Rock* as a **Physical Barrier** type as well.






Dry: There is no water in this structure, though water is flowing in the stream. Note that if you recorded *No Flow* for crossing Flow Condition, you should not select *Dry* here, as we expect a dry structure at a dry crossing; it is not in itself a physical barrier. This barrier type helps to identify passage problems associated with overflow or secondary crossing structures.









Other: There may be different situations that do not fit clearly into one of the above categories, but may still represent significant physical barriers to aquatic organism passage. Use this option to capture such situations, and add information in Structure Comments. Below are examples of some unusual physical barriers which may not fit under Physical Barrier categories listed above.









These are examples of structures with a combination of physical barriers. Multiple relevant barrier types should be selected.







Severity: Choose only one option for each surveyed structure, and rank the severity based on an assessment of *the cumulative effect of all physical barriers affecting that structure* according to the table that follows. Do not consider information already captured in **Outlet Grade**. Decide on an overall severity for each structure by considering all the different Physical Barriers present. If any barrier affects more than one structure at a crossing, it should be included in the severity rating for each structure affected. Refer to the table below for guidance in choosing the **Severity** rating.

Physical Barrier	Severity	Severity Definition
None	*None*	No physical barriers exist - **apart from** Outlet Grade
Debris/Sediment/Rock *Logs, branches, leaves, silt, sand, gravel, rock*	*None*	None beyond few leaves or twigs as may occur in stream
	Minor	< 10% of the open area of the structure is blocked
	Moderate	10% - 50% of open area blocked
	Severe	> 50% of open area of structure blocked
Deformation *Significant dents, crushed metal, collapsing structures*	*None*	Small dents and cracks – insignificant effect on flow
	Minor	Flow is limited < 10%
	Moderate	Flow is limited between 10% - 50%
	Severe	Flow is limited > 50%
Free Fall *Vertical or near-vertical drop*	*None*	No vertical drop exists - **apart from** Outlet Grade
	Minor	0.1 - 0.3 foot vertical drop - **apart from** Outlet Grade
	Moderate	0.3 - 0.5 foot vertical drop - **apart from** Outlet Grade
	Severe	> 0.5 foot vertical drop - **apart from** Outlet Grade
Fencing *Wire, metal grating, wood*	*None*	No fencing exists in any part of the structure
	Minor	Widely spaced wires or grating with > 0.5 foot (6 inch) gaps
	Moderate	Wires or grating with 0.2 - 0.5 foot (~ 2-6 inches)spacing
	Severe	Wires or grating with < 0.2 foot (~ 2 inch) spacing
Dry	*Minor*	May be passable at somewhat higher flows
	Moderate	Not likely passable at higher flows
	Severe	Impassable at higher flows
Other	*Minor*	Use best judgment based on above standards
	Moderate	Use best judgment based on above standards
	Severe	Use best judgment based on above standards

Water Depth Matches Stream: Compare the water depth inside the structure with the water depth in the natural stream channel away from the influence of the crossing. Choose only one option.

Yes: The depth in the crossing falls within the range of depths naturally occurring in that reach of the stream and **for comparable distances** along the length of the stream. For example, if a structure has a water depth of 0.2 feet through the entire structure's length of 60 feet, and there comparable sections of the stream with a 0.2 foot water depth for approximately 60 feet of the channel, select *Yes*.

No-Shallower: This means that the water depth in the crossing is less than depths that occur naturally in a similar length of the undisturbed stream, or the shallower depth through the structure covers a greater length than occurs in the natural stream.

No-Deeper: This means that the water depth in the crossing is greater than depths that occur naturally in a similar length of the undisturbed stream. This is rarely observed.

Unknown: A comparison of structure depth to natural stream depth is not possible.

Water Velocity Matches Stream*:* Compare the water velocity inside the structure with the velocity in the natural stream channel away from the influence of the crossing. Choose only one option.

Yes: The water velocity in the crossing falls within the range of velocities naturally occurring in that reach of the stream **for comparable distances**. If velocities in the crossing are observed in the natural stream channel, and those velocities persist over the same distance as the structure length, select *Yes.*

No-Faster: This means that the water velocity in the structure is greater than velocities that occur naturally in a similar length of the undisturbed stream, or the velocity through the structure persists over a longer distance than occurs in the natural stream.

No-Slower: This means that the velocity in the crossing is less than velocities that occur naturally in a similar length of the undisturbed stream. This is rarely observed.

Unknown: A comparison of structure velocity to natural stream velocity is not possible.

Dry Passage Through Structure? Consider this question two different ways, depending on whether water is flowing through the structure. Choose only one option.

If there is water flowing in the structure: Is there a continuous dry stream bank through at least one side of the structure that allows the safe movement of terrestrial or semi-aquatic animals, and does this dry pathway connect to the stream banks upstream and downstream of the structure?

If there is no water flowing in the structure: then there is continuous dry passage through the structure.

Yes: A continuous bank connects upstream, through the structure, and downstream, or there is otherwise continuous dry passage through the structure.

No: There is no dry passage, the dry passage is not continuous, or the dry passage through the structure does not connect with stream banks upstream or downstream.

Unknown: It is not possible to determine if continuous dry passage exists through this structure.

N/A

Height Above Dry Passage: If there is dry passage through the structure, measure the average height from the dry stream bank to the top of the structure directly above (i.e., the clearance) to the nearest tenth of a foot. If both stream banks are dry and connected, record the higher measurement. If the structure has no water flow, measure the average height above the bottom of the structure or dry stream bed to the top of the structure.

Comments: Use this area to briefly comment on any aspects of the structure needing more information. Enter comments about the overall crossing in the **Crossing Comments** box.

AQUATIC CONNECTIVITY

Stream Crossing Survey

DATA FORM

DATABASE ENTRY BY _____ ENTRY DATE _____

DATA ENTRY REVIEWED BY _____ REVIEW DATE _____

CROSSING DATA

~~Crossing Code~~ N/A _____ **Local ID** (Optional) _____

Date Observed (00/00/0000) _____ **Lead Observer** _____

Town/County _____ **Stream** _____

Road _____ **Type** ☐ MULTILANE ☐ PAVED ☐ UNPAVED ☐ DRIVEWAY ☐ TRAIL ☐ RAILROAD

GPS Coordinates (Decimal degrees) ☐☐.☐☐☐☐☐ °N Latitude — ☐☐.☐☐☐☐☐ °W Longitude

Location Description

Crossing Type ☐ BRIDGE ☐ CULVERT ☐ MULTIPLE CULVERT ☐ FORD ☐ NO CROSSING ☐ REMOVED CROSSING ☐ BURIED STREAM ☐ INACCESSIBLE ☐ PARTIALLY INACCESSIBLE ☐ NO UPSTREAM CHANNEL ☐ BRIDGE ADEQUATE

Number of Culverts/ Bridge Cells AKA "Number of Barrels"

Photo IDs INLET _____ OUTLET _____ UPSTREAM _____ DOWNSTREAM _____ OTHER _____

Flow Condition ☐ NO FLOW ☐ TYPICAL-LOW ☐ MODERATE ☐ HIGH

Crossing Condition ☐ OK ☐ POOR ☐ NEW ☐ UNKNOWN

N/A ~~**Tidal Site** ☐ YES ☐ NO ☐ UNKNOWN~~

Alignment AKA "Crossing Alignment to Stream" ☐ FLOW-ALIGNED ☐ SKEWED (>45°)

Road Fill Height (Top of culvert to road surface; bridge = 0) _____

Bankfull Width (Optional) _____ **Confidence** ☐ HIGH ☐ LOW/ESTIMATED

Tailwater Scour Pool ☐ NONE ☐ SMALL ☐ LARGE

Constriction ☐ SEVERE ☐ MODERATE ☐ SPANS ONLY BANKFULL/ ACTIVE CHANNEL ☐ SPANS FULL CHANNEL & BANKS

Crossing Comments

STRUCTURE 1

Structure Material ☐ METAL ☐ CONCRETE ☐ PLASTIC ☐ WOOD ☐ ROCK/STONE ☐ FIBERGLASS ☐ COMBINATION

OUTLET

Outlet Shape ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ FORD ☐ UNKNOWN ☐ REMOVED

Outlet Armoring ☐ NONE ☐ NOT EXTENSIVE ☐ EXTENSIVE

Outlet Grade (Pick one) ☐ AT STREAM GRADE ☐ FREE FALL ☐ CASCADE ☐ FREE FALL ONTO CASCADE ☐ CLOGGED/COLLAPSED/SUBMERGED ☐ UNKNOWN

Outlet Dimensions **A. Width** _____.__ **B. Height** _____.__ **C. Substrate/Water Width** _____.__ **D. Water Depth** _____.__

Outlet Drop to Water Surface _____.__ **Outlet Drop to Stream Bottom** _____.__ **E. Abutment Height** (Type 7 bridges only) _____.__

L. Structure Length (Overall length from inlet to outlet) _____.__

INLET

Inlet Shape ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ FORD ☐ UNKNOWN ☐ REMOVED

Inlet Type ☐ PROJECTING ☐ HEADWALL ☐ WINGWALLS ☐ HEADWALL & WINGWALLS ☐ MITERED TO SLOPE ☐ OTHER ☐ NONE

Inlet Grade (Pick one) ☐ AT STREAM GRADE ☐ INLET DROP ☐ PERCHED ☐ CLOGGED/COLLAPSED/SUBMERGED ☐ UNKNOWN

Inlet Dimensions **A. Width** _____.__ **B. Height** _____.__ **C. Substrate/Water Width** _____.__ **D. Water Depth** _____.__

ADDITIONAL CONDITIONS

N/A ~~**Slope %** (Optional) _____~~ ~~**Slope Confidence** ☐ HIGH ☐ LOW~~

Internal Structures ☐ NONE ☐ BAFFLES/WEIRS ☐ SUPPORTS ☐ OTHER _____

Structure Substrate Matches Stream ☐ NONE ☐ COMPARABLE ☐ CONTRASTING ☐ NOT APPROPRIATE ☐ UNKNOWN

Structure Substrate Type (Pick one) ☐ NONE ☐ SILT ☐ SAND ☐ GRAVEL ☐ COBBLE ☐ BOULDER ☐ BEDROCK ☐ UNKNOWN

Structure Substrate Coverage ☐ NONE ☐ 25% ☐ 50% ☐ 75% ☐ 100% ☐ UNKNOWN

Physical Barriers (Pick all that apply) ☐ NONE ☐ DEBRIS/SEDIMENT/ROCK ☐ DEFORMATION ☐ FREE FALL ☐ FENCING ☐ DRY ☐ OTHER

Severity (Choose carefully based on barrier type(s) above) ☐ NONE ☐ MINOR ☐ MODERATE ☐ SEVERE

Water Depth Matches Stream ☐ YES ☐ NO-SHALLOWER ☐ NO-DEEPER ☐ UNKNOWN ☐ DRY

Water Velocity Matches Stream ☐ YES ☐ NO-FASTER ☐ NO-SLOWER ☐ UNKNOWN ☐ DRY

Dry Passage through Structure? ☐ YES ☐ NO ☐ UNKNOWN ~~**Height above Dry Passage**~~ N/A

Comments

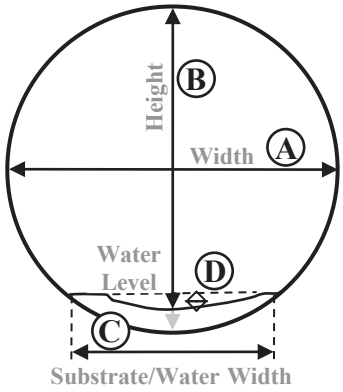
5/26/16

Structure Shape & Dimensions

1) Select the Structure Shape number from the diagrams below and record it on the form for Inlet and Outlet Shape.
2) Record on the form in the approriate blanks dimensions **A**, **B**, **C** and **D** as shown in the diagrams;
   C captures the width of water or substrate, whichever is wider; for dry culverts without substrate, C = 0.
   D is the depth of water -- be sure to measure inside the structure; for dry culverts, D = 0.
3) Record Structure Length (**L**). (Record abutment height (**E**) only for Type 7 Structures.)
4) For multiple culverts, also record the Inlet and Outlet shape and dimensions for each additional culvert.

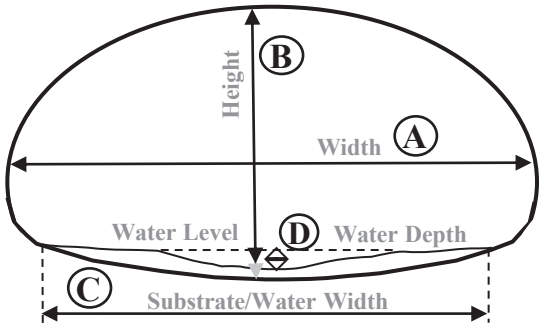
NOTE: Culverts 1, 2 & 4 may or may not have substrate in them, so height measurements (B) are taken from the level of the "stream bed", whether that bed is composed of substrate or just the inside bottom surface of a culvert (grey arrows below show measuring to bottom, black arrows show measuring to substrate).

1



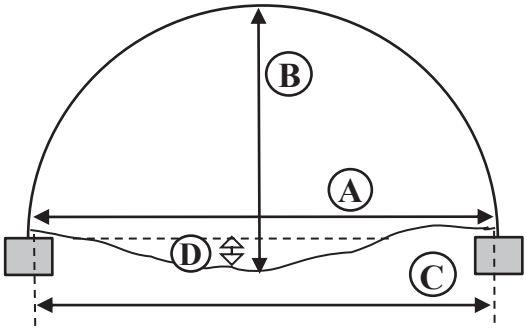
Round Culvert

2



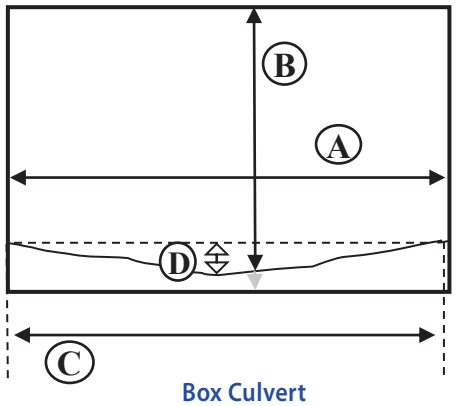
Pipe Arch/Elliptical Culvert

3



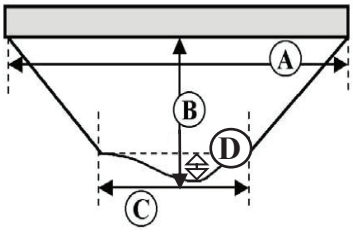
Open Bottom Arch Bridge/Culvert

4



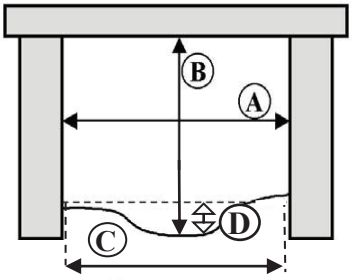
Box Culvert

5



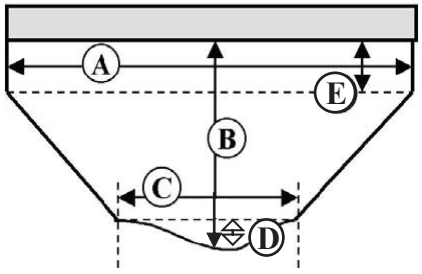
Bridge with Side Slopes

6



Box/Bridge with Abutments

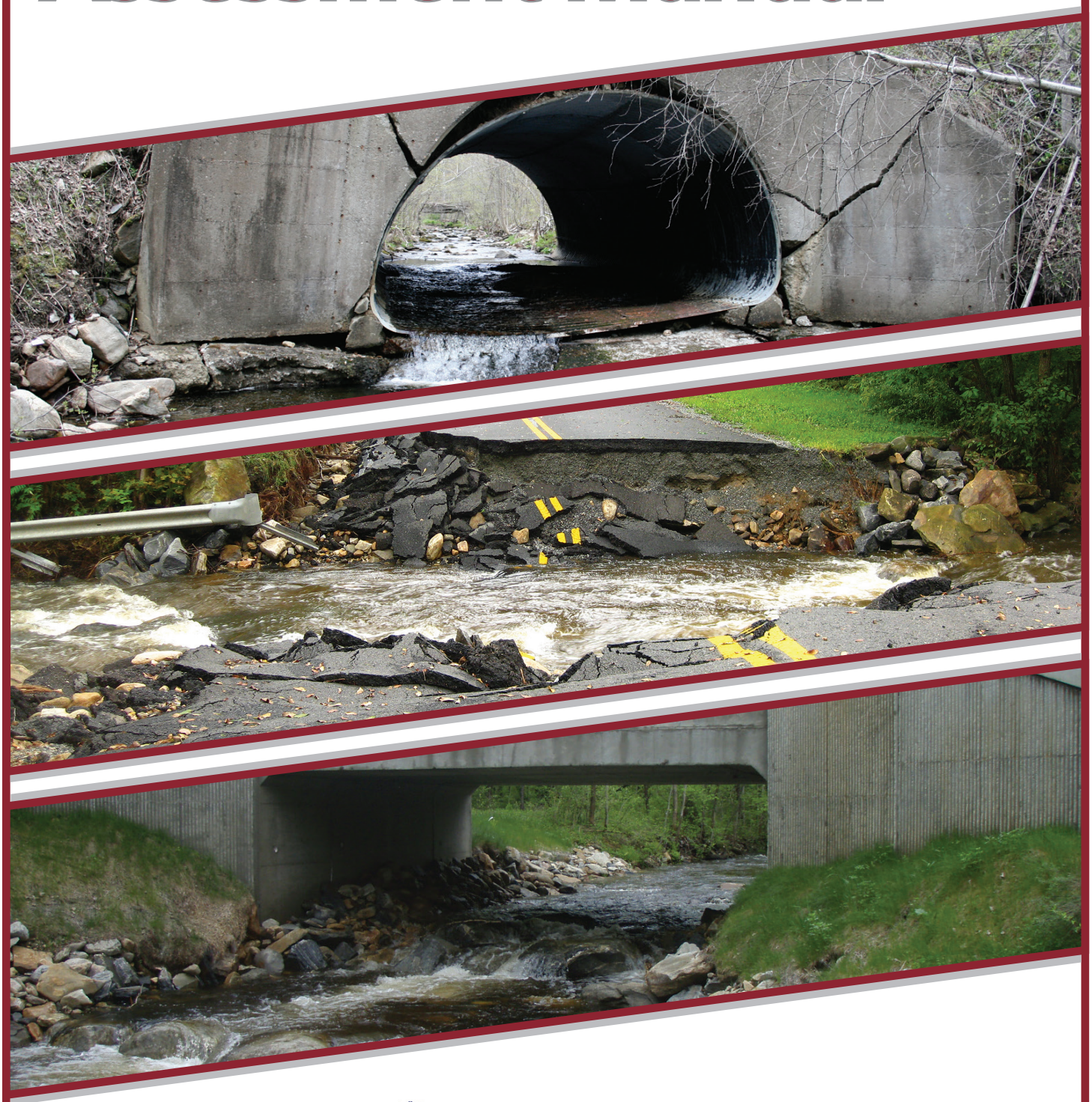
7



Bridge with Abutments and Side Slopes

2019 Edition

Culvert Condition Assessment Manual



The Center for Agriculture, Food and the Environment

North Atlantic Aquatic Connectivity Collaborative NAACC

The Nature Conservancy

UMassAmherst
College of Engineering
UMass Transportation Center

Purpose

This document provides guidance for completing the Culvert Condition Assessment Form. The information collected will assist in the identification of culverts for repair or replacement. The assessment data form is to be used for an entire road-stream crossing, which may include single or multiple culverts or multiple cell bridges. The top of the form (see page 22) contains general information about the crossing and the bottom half of that page is for specific data on the condition of the crossing. The form is designed for a rapid assessment by trained lay observers (not necessarily engineers) for purposes of flagging crossings that should be examined more closely for potential structural deficiencies. It is essential to gather all of the data required for each structure for accurate assessment of the entire crossing. This assessment module is one of several develop and maintained by the North Atlantic Aquatic Connectivity Collaborative (NAACC). Data collected through use of this Culvert Assessment Form will be stored in the NAACC online database on the NAACC website: https://www.streamcontinuity.org/

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Safety

Safely conducting the Culvert Assessment is of the utmost importance. The conditions under which assessments can be done should require the following items for a team of two assessors. Assessments requiring advanced safety equipment (i.e. climbing rope, air monitoring devices) should not be done unless conducted by people with the proper safety training and equipment.

List of Culvert Sites and Map
Assessment Guide
Blank Assessment Forms
Clipboards and Writing Implements
2 Waterproof Flashlights and/or Headlights
4 28" Orange Collapsible Safety Cones with Reflective Bands
2 Class II Safety Vests
2 Safety Glasses
2 Work Gloves and/or Heavy Rubber Gloves
Camera
Hand Held GPS
2 Chest Waders
2 Cell Phones and/or Portable Radios
Bug Spray
First Aid Kit with Blood Stop
Snake Bite and Poisonous Vegetation Kits
Pruning Shears or Machete
A Pocket Rod
Chipping Hammer
Duct Tape
Gallon Size Ziploc Bags
5 Gallon Bucket (to carry items)
100' Reel Tape (measurements should be in feet and tenths of feet)
Telescoping Stadia Rod
Measuring Wheel
Small Round Point Shovel
Small Iron Rake (7" wide)
Wasp and Hornet Spray
Probing Rod or Walking Stick



Completing the Culvert Condition Assessment Form

Before heading to the field, plan a route and discuss a strategy to most efficiently assess the maximum number of culverts within the time allowed. Make sure you have everything in your vehicle that you will need for the entire time you plan to stay in the field. When you arrive at the site, identify a safe location to park the vehicle. If it is on the shoulder of the road, place the orange safety cones in a manner to alert traffic as to its presence. Ideally the vehicle is parked off the roadway as not to interfere with traffic. Don your personnel protective equipment, scan the site for potential hazards and collect your forms and tools.

Start by completing all general information on the Culvert Assessment Form such as Date, Lead Observer, Location, Time, Weather, etc... If any information is unknown, leave the space blank.

Position yourself on the road as close to the midpoint of the culvert as is safely possible to determine and record the GPS coordinates in decimal degrees. A GPS device is required for this step. GPS devices should be set to WGS84 datum.

Starting with the outlet side of the culvert and record the pertinent data in the boxed sections of the form. If there is a circumstance or area of concern that is not covered on the form, record the information in the "Notes" section. Take as many photographs as is necessary to properly record the condition of the culvert and appurtenances. Identify the photographs by number and description in the shaded area at the bottom of the form.

Safely move to the inlet side of the culvert, record the pertinent data in the boxed sections of the form. If there is a circumstance or area of concern that is not covered on the form, record the information in the "Notes" section. Take as many photographs as is necessary to properly record the condition of the culvert and appurtenances. Identify the photographs by number and description in the shaded area at the bottom of the form.



Observe the condition of the pavement or soil above the culvert and note any holes or cracks which could indicate a void underneath.

In the field assess each aspect of the culvert (including appurtenances) as "Adequate," "Poor," or "Critical." Aspects that are new, excellent, very good or good are all classified as "Adequate" for purposes of this assessment. The manual describes, in text and photographs, characteristics of culverts that would lead to assessments of adequate, poor and critical. If you are unsure of any terminology on the form, please refer to the glossary on page 24.

It is necessary to complete a Culvert Assessment Form for each culvert. For example, if two culverts are side by side and have identical characteristics, two culvert forms must still be completed. Standing at the inlet of a crossing with multiple culverts looking downstream, the culvert on the left will be #1. Continue numbering the culverts sequentially going from left to right.

For maintenance purposes, the Performance Problems Requiring Action section should be completed and the appropriate agencies notified of any areas of concern.

Complete and store the Culvert Assessment Form(s) and then head safely to the next crossing location.

Culvert Reference Material

A glossary of terms used in the Culvert Condition Assessment Form may be found on page 25 of this manual. The Culvert Assessment Reference Chart which contains detailed descriptions of Culvert Shapes and Dimensions can be found on page 23







Invert Deterioration





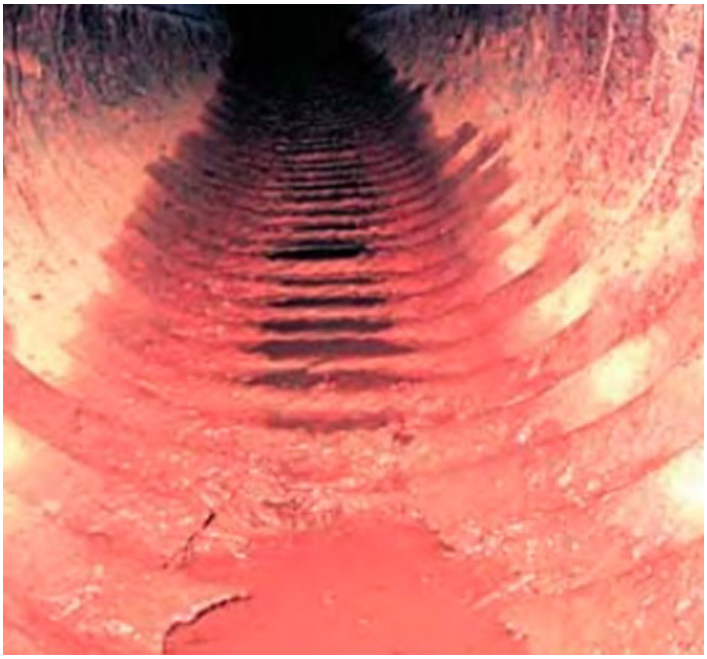
Adequate

Minor corrosion and pitting, no holes or distortion. Cannot penetrate metal with sharp point of chipping hammer. Minor isolated spalls in concrete.



Poor

Perforations visible and/or connection hardware failing (metal). Heavy abrasion and scaling with exposed steel reinforcement (concrete). Heavy abrasion or scour damage (plastic). Displaced mortar and/or blocks, holes in invert area (masonry).



Critical

Holes or section loss with extensive voids beneath invert and/or embankment/roadway damage. Holes and gaps with extensive infiltration of soil, bedding, or backfill material (masonry).

Joints & Seams





Adequate

Minor separation of joints and seams up to 1", minor backfill infiltration.



Poor

Significant separation of joints and seams between 1" to 3"; infiltration of backfill into culvert; voids visible in fill through offset of joints.

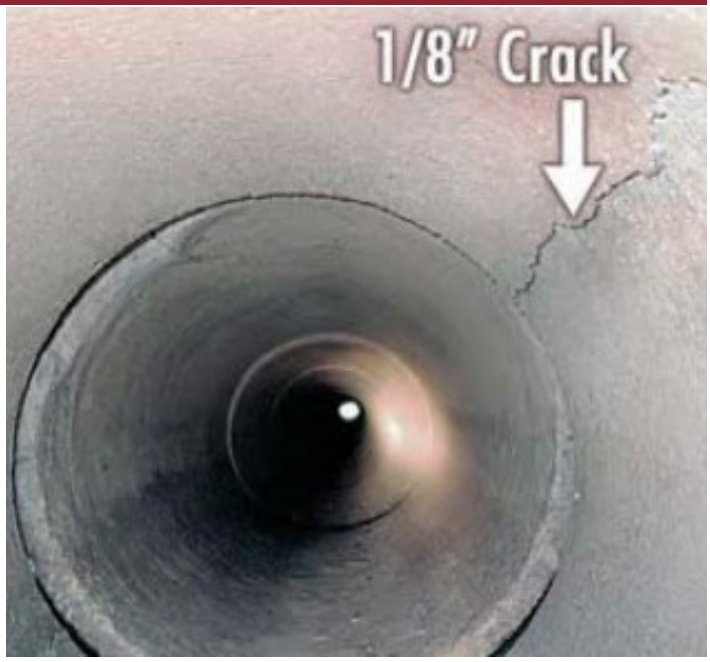


Critical

Severe separation of joints and seams greater than 3"; infiltration of backfill into culvert; large voids visible in fill through offset of joints.

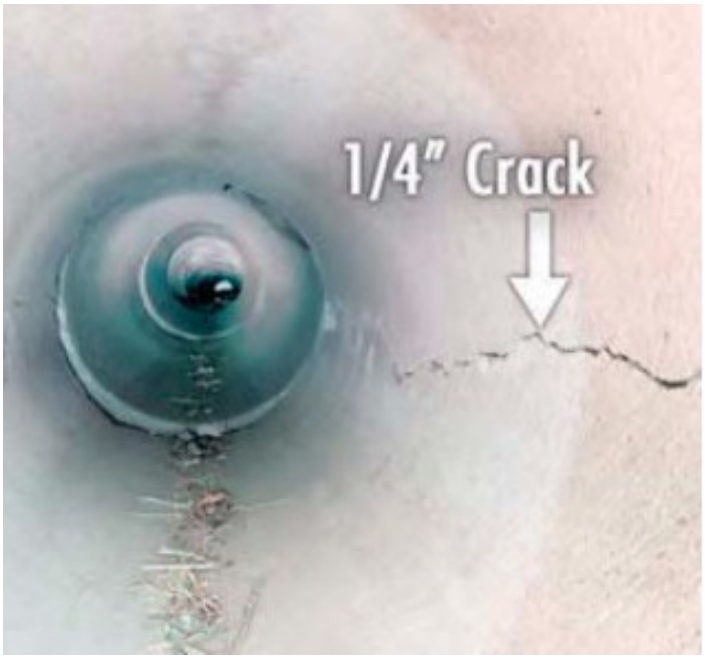
Structural Integrity of Barrel (Concrete)





Adequate

Longitudinal cracks less than 1/8" in width, spalls up to 1/4" deep.



Poor

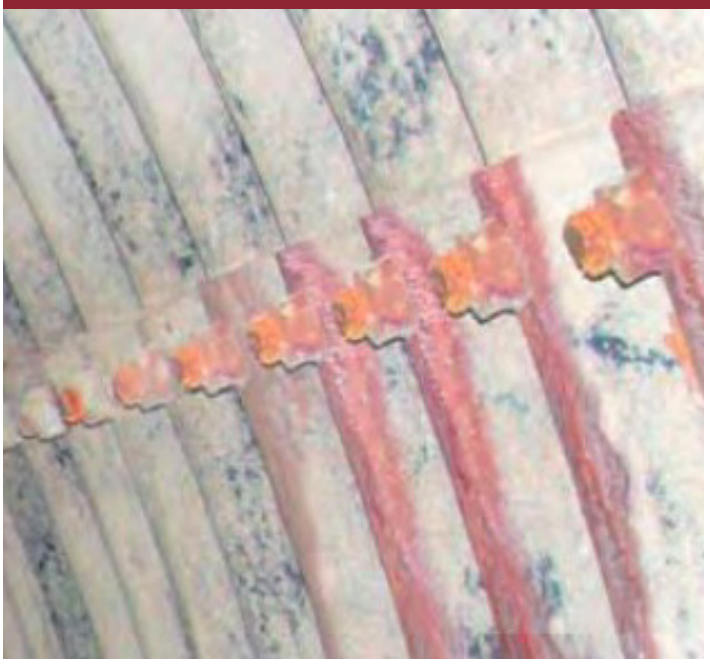
Longitudinal cracks between 1/8"-1/4" in width, spalls larger than 1/2" deep, and spalls have exposed rebar.

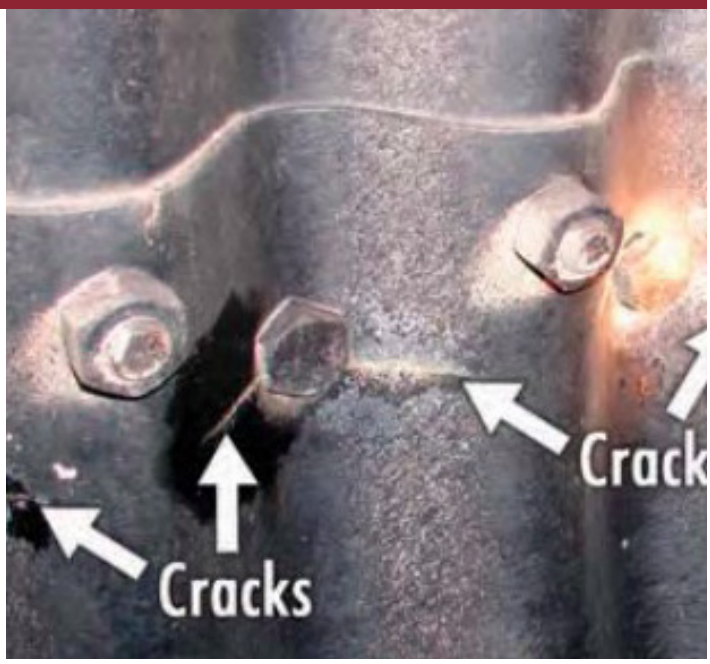


Critical

Severe cracking and spalls greater than 1/2" on culvert walls, sections of culvert are partially collapsed, major corrosion of rebar.

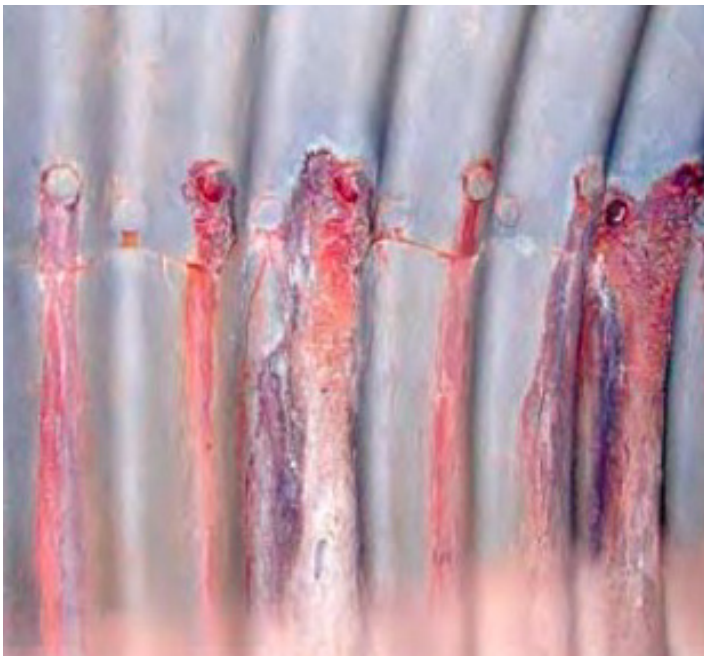
Structural Integrity of Barrel (Metal)





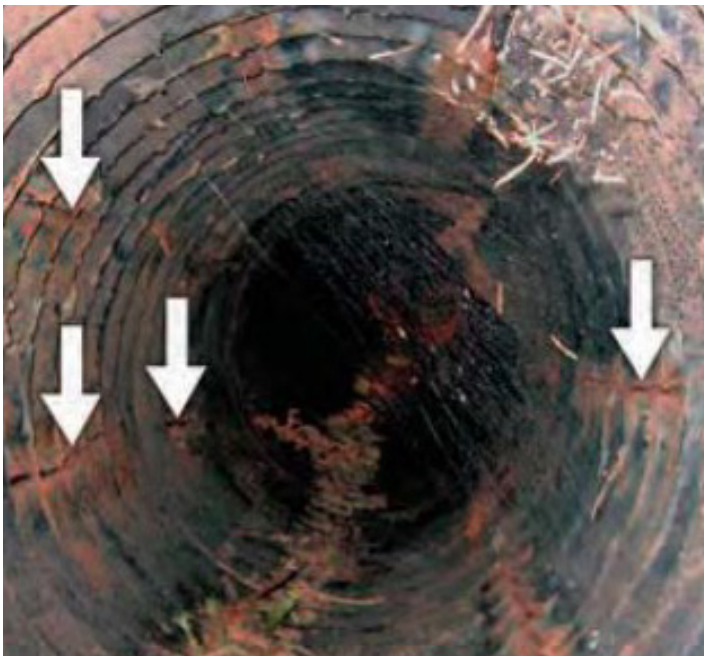
Adequate

Minor cracking around bolt holes or seams at isolated sections.



Poor

Significant cracking and/or deterioration along bolt holes and isolated seams of plates.



Critical

Severe cracking and or deterioration along bolt holes and along seams of plates.

Structural Integrity of Barrel (Plastic)





Adequate

Minor isolated rip or tear caused by debris less than 6″ in length and 1/2″ in width. Minor cuts or gouges to end sections from maintenance or construction activities.



Poor

Cracking, splits or tears over 6″ in length and up to 3/4″ in width. Openings in pipe causing loss of backfill material.



Critical

Cracking, splits, punctures, or tears over 6″ in length and over 1″ in width. Openings in pipe causing loss of backfill material.

Headwall/Wingwall





Adequate

Minor spalls and cracks less than 1/8" in width. No exposed rebar or surface evidence of rebar corrosion. Minor settlement of the wall.



Poor

Significant spalls and cracks between 1/8" to 1/4" in width. Exposed rebar with corrosion. Significant settlement of the wall.



Critical

Extensive deterioration with loss of concrete. Corrosion of rebar and extensive section loss. Extensive settlement of the wall.

Apron





Adequate

Some minor undermining of culvert and small scour hole. Some deterioration of joint between apron and headwall.



Poor

Significant undermining of culvert and evidence of scour hole. Significant deterioration of joint between apron and headwall.

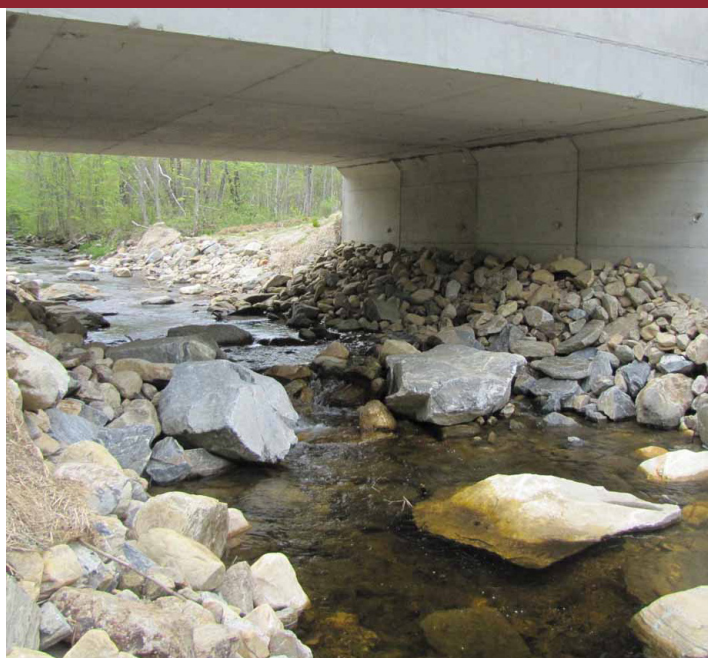


Critical

Extensive undermining of culvert and development of a large hole under a structural element of the culvert. Substantial deterioration of joint between apron and headwall.

Armoring





Adequate

Streambed and streambanks are reinforced with a protective covering of rocks or engineering materials.



Poor

Significant displacements, undermining or deterioration affecting the performance of the culvert structure.



Critical

Partially or totally failed, significantly affecting performance and/or causing embankment/roadway damage or undermining of the culvert barrel or footings.

Embankment Piping





Fair

Embankment moist only in areas surrounding culvert barrel. No evidence of flow or sediment transport observed.



Poor

Evidence of seepage through the embankment along the outside of the culvert barrel, sediment transport not observed.



Critical

Evidence of flow through embankment along the outside of culvert barrel. Evidence of sediment transport, "voids" or sink holes observed.

Cross-Section Deformation (Metal)

METAL	CULVERT SIZES (Round Pipes) Original pipe diameter 12″	24″	36″	48″	60″	72″	84″
GOOD	< 12 1/2	< 25 3/16	< 37 3/4	< 50 1/4	< 63	< 75 1/2	< 88 1/4
FAIR (5% - 15%)	12 1/2 - 13 3/4	25 3/16 - 27 1/2	37 3/4 - 41 1/2	50 1/4 - 55 1/4	63 - 69	75 1/2 - 82 3/4	88 1/4 - 96 1/2
POOR (15% -20%)	13 3/4 - 14 1/2	27 1/2 - 28 3/4	41 1/2 - 43 1/4	55 1/4 - 57 1/2	69 - 72	82 3/4 - 86 1/2	96 1/2 - 101
CRITICAL (>20%)	> 14 1/2	> 28 3/4	> 43 1/4	> 57 1/2	> 72	> 86 1/2	> 100

Observed culvert width or span

Adequate

Minor distortions isolated within the pipe resulting in flattening of invert and/or crown. Isolated sections are slightly non-symmetrical. Span dimension is within 5-15% of design.

Poor

Significant distortions within the pipe resulting in flattening of invert and/or crown of pipe. Span dimension is within 15-20% of design.

Critical

Severe distortions and deflection within the pipe; flattening of the crown or invert; structure is partially collapsed. Span dimension is greater than 20% of design.

Cross-Section Deformation (Plastic)

PLASTIC	CULVERT SIZES (Round Pipes)						
	Original pipe diameter						
	12″	24″	36″	48″	60″	72″	84″
GOOD	< 12 1/2	< 25 3/16	< 37 3/4	< 50 1/4	< 63	< 75 1/2	< 88 1/4
FAIR (5% - 10%)	12 1/2 - 13 1/4	25 3/16 - 26 3/8	37 3/4 - 39 1/2	50 1/4 - 52 3/4	63 - 66	75 1/2 - 79 1/4	88 1/4 - 92 1/2
POOR (10% -15%)	13 1/4 - 13 3/4	26 3/8 - 27 1/2	39 1/2 - 41 1/2	52 3/4 - 55 1/4	66 - 69	79 1/4 - 82 3/4	92 1/2 - 96 1/2
CRITICAL (>15%)	> 13 3/4	> 27 1/2	> 41 1/2	> 55 1/4	> 69	> 82 3/4	> 96 1/2

Observed culvert width or span

Adequate

Minor isolated distortions and dimpling within the pipe. Pipe deflection 5-10% from original shape.

Poor

Significant distortions; wall buckling; flattening of invert/crown throughout the pipe. Pipe deflection 10-15% from original shape.

Critical

Severe distortions; wall buckling; flattening of invert/crown throughout the pipe; cracking/tearing present. Pipe deflection greater than 20% of original shape.

Structural (Longitudinal) Alignment





Adequate

Minimal horizontal or vertical misalignment of the pipe.



Poor

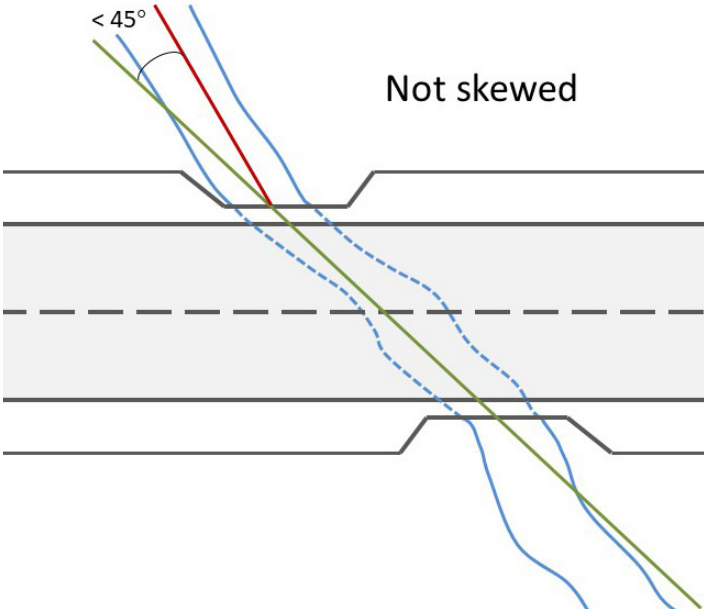
Significant horizontal or vertical misalignment of the pipe (Note: do not confuse this with constructed pipe bends).



Critical

Significant misalignment resulting in deformation of pipe or embankment/roadway damage.

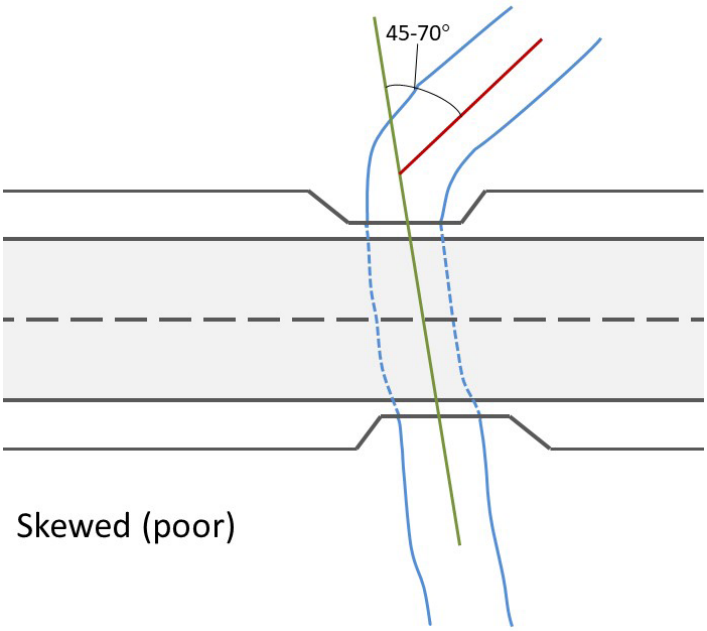
Channel Alignment





Adequate

Angle measured from upstream channel to centerline of culvert barrel is from 0-45 degrees.



Poor

The stream channel approaches the crossing at an angle of 45-70 degrees from the centerline of the structure.



Critical

The stream channel approaches the crossing at an angle of 70-90 degrees from the centerline of the structure.

Footing





Adequate

Minor to moderate deterioration. Concrete -moderate cracking, scaling or leaching (minor delamination or spalling). Masonry - moderate weathering (minor joint deterioration). Slight settlement or undermining. Minor footing exposure.



Poor

Extensive deterioration. Concrete - extensive cracking, scaling or leaching (delamination or spalling may be prevalent). Masonry - extensive weathering (significant joint deterioration). Significant settlement or undermining. Footing exposed and undermined.



Critical

Severe or critical deterioration. Function or structural capacity of the culvert has been severely impacted - immediate repairs or structural analysis may be required. Concrete - severe cracking, scaling, delamination, or spalling. Masonry - severe weathering (failed joints or displaced masonry blocks) Severe settlement or undermining.

Level of Blockage





Adequate

Blockage is 10-30% of opening.



Poor

Blockage is 30-75% of opening.



Critical

Blockage is >75% of opening.

Flared End Section





Adequate

Minor cracking, deterioration, or deformation. Minor undermining.



Poor

Significant cracks, piping or undermining affects >50% of appurtenance. End crushed or separated from barrel.



Critical

Deterioration is significantly effecting performance and/or causing embankment and/or roadway damage.

Buoyancy or Crushing





Adequate

Hydraulic uplift is overcome by a combination of the weight of the pipe, weight of the fill material over the pipe and weight of the water in the pipe.



Poor

Light to moderate denting or deformation of inlet and/or outlet end of flexible pipe culvert. The invert of the inlet is at the streambed elevation (no uplift).



Critical

Invert of inlet bent upward above stream bed or mitered edges crumpled inward.

Culvert Assessment Form

CROSSING DATA

For multiple culvert crossings use one sheet per culvert. Go from left to right, standing at inlet looking downstream.

Crossing Code:_____ **Local ID**: (Optional)_____ **Date Observed:** (00/00/0000) ____/____/_____ Lead **Observer:**_____

Number of Culverts: ____ **Culvert** ___ **of** ____ **Stream:**_____ **Road:**_____

Location: (St.#, Pole#, Etc.)_____ **Town:**_____ **County**:_____ State:_____

GPS Coordinates: __ __ . __ __ __ __ __°N Latitude __ __ . __ __ __ __ __ °W Longitude Time:_____ Weather:_____

Crossing Type: ☐Bridge ☐Culvert ☐Multiple Culvert ☐Ford ☐No Crossing ☐Removed Crossing ☐Buried Stream ☐Inaccessible ☐Partially Inaccessible ☐No Upstream Channel

Culvert Material: ☐Metal ☐Concrete ☐Plastic ☐Wood ☐Rock/Stone ☐Fiberglass ☐Combination **Length of Culvert**: _____

INLET

Appurtenance: ☐Headwall ☐Wingwalls ☐Headwall & Wingwalls ☐Mitered To Slope ☐Projecting ☐Flush ☐Recessed ☐Other ☐None

Inlet Shape: ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 **Inlet Dimensions: A. Width:**____**B. Height:**____**C. Substrate/Water Width:**____**D. Water Depth:**____**E. Abutment Height:**____

Inlet Grade: ☐At Stream Grade ☐Inlet Drop ☐Perched ☐Clogged/Collapsed/Submerged ☐Unknown

OUTLET

Appurtenance: ☐Headwall ☐Wingwalls ☐Headwall & Wingwalls ☐Mitered To Slope ☐Projecting ☐Flush ☐Recessed ☐Other ☐None

Outlet Shape: ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 **Outlet Dimensions: A. Width:**____**B. Height:**____**C. Substrate/Water Width:**____**D. Water Depth:**____**E. Abutment Height:**____

Outlet Grade: ☐At Stream Grade ☐Free Fall ☐Cascade ☐Free Fall Onto Cascade ☐Clogged/Collapsed/Submerged ☐Unknown

	INLET *Please check only one level for each item*					**OUTLET** *Please check only one level for each item*				
	Adequate	Poor	Critical	Unknown	N/A	Adequate	Poor	Critical	Unknown	N/A
Structural (Longitudinal) Alignment	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Channel Alignment	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Level of Blockage	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Flared End Section	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Invert Deterioration	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Buoyancy or Crushing	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Cross-Section Deformation	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Structural Integrity of Barrel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Joints and Seams	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Footings	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Headwall/Wingwalls	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Armoring	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Apron	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Embankment Piping	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

To provide additional feedback on performance problems use the optional second sheet

Performance Problems Requiring Action

Debris/Veg Blockage >1/3 of rise	☐	Local Outlet Scour	☐	Embankment Slope Instability	☐
Sediment Blockage >1/2 the opening	☐	Previous and/or Frequent Overtopping	☐	No Access/Ends Totally Buried/Submerged	☐
Buoyancy or Crushing-Related Inlet Failure	☐	Embankment Piping	☐	Aggressive Abrasion/Corrosion/Chemical	☐
Poor Channel Alignment	☐	Channel Degradation/Headcut	☐	Exposed Footing (Open-Bottom Culvert Only)	☐

Notes:_____

_____

_____

Photo #:____ **Description:**_____ **Photo #:**____ **Description:**_____

Photo #:____ **Description:**_____ **Photo #:**____ **Description:**_____

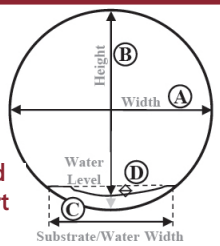
Photo #:____ **Description:**_____ **Photo #:**____ **Description:**_____

Photo #:____ **Description:**_____ **Photo #:**____ **Description:**_____

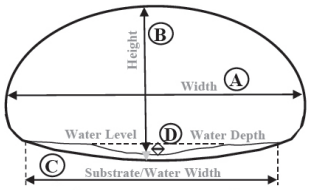
Culvert Assessment Reference Chart

CULVERT SHAPE & DIMENSIONS

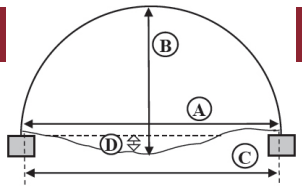
1. Round Culvert



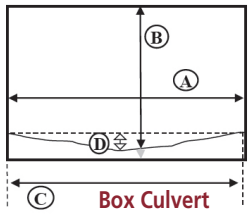
2. Pipe Arch/Elliptical Culvert



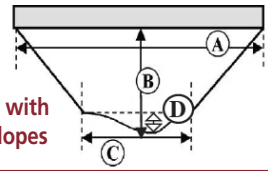
3. Open Bottom Arch Bridge/Culvert



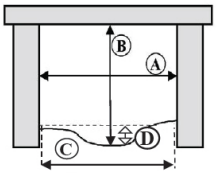
4. Box Culvert



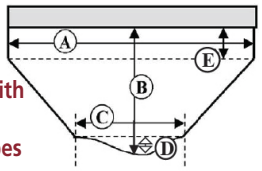
5. Bridge with Side Slopes



6. Box/Bridge with Abutments



7. Box/Bridge with Abutments and Side Slopes



CULVERT CONDITION REFERENCE

Structural (Longitudinal) Alignment

Poor: Significant horizontal or vertical misalignment of the pipe (Note: do not confuse this with constructed pipe bends).

Critical: Significant misalignment resulting in deformation of pipe or embankment/ roadway damage.

Channel Alignment

Poor: The stream channel approaches the crossing at an angle of 45-70 degrees from the centerline of the structure.

Critical: The stream channel approaches the crossing at an angle of 70-90 degrees from the centerline of the structure.

Level of Blockage

Poor: Debris/sediment/vegetation blocks 1/3 of more of the inlet/outlet opening.

Critical: Sediment blocks more than ½ the inlet/outlet opening (and not designed that way for aquatic organism passage).

Flared End Section

Poor: Significant cracks, piping or undermining affects >50% of section. End crushed or separated from barrel.

Critical: Deterioration is significantly affecting performance and/or causing embankment/ roadway damage.

Invert Deterioration

Poor: Perforations visible and/or connection hardware failing (metal). Heavy abrasion and scaling with exposed steel reinforcement (concrete). Heavy abrasion or scour damage (plastic). Displaced mortar and/or blocks, holes in invert area (masonry)

Critical: Holes or section loss with extensive voids beneath invert and/or embankment/ roadway damage. Holes and gaps with extensive infiltration of soil, bedding or backfill material (masonry).

Bouyancy or Crushing

Poor: Light to moderate denting or deformation of inlet and/or outlet end of fl exible pipe culvert. The invert of the inlet is at the streambed elevation (no uplift).

Critical: Invert of inlet bent upward above streambed or mitered edges crumpled inward.

Cross-Section Deformation

Poor: Significant perceptible deformation. Deformation with accompanying longitudinal cracking (concrete).

Critical: Excessive deformation resulting in significant reduction of available flow area, and/or extensive infiltration of soil, voids, structural failure or embankment/roadway damage.

Structural Integrity of Barrel

Poor: *Concrete:* Open cracks >1/8" wide with voids and significant infiltration of soil and/or leakage of water. Heavy rust staining and/or exposed steel reinforcement in sides and top of barrel.
Masonry: Missing and/or displaced blocks
Plastic: Several splits, tears and cracks >6" long. Significant deformation of liner or wall buckling.

Critical: Cracks, tears, splits, bulges, holes or section loss have led to extensive infiltration of soil, structural failure, voids and embankment/ roadway damage.

Joints and Seams

Poor: Open or displaced with significant infiltration of soil and/or leakage of water and voids visible. Missing mortar or displaced blocks (masonry).

Critical: Open or displaced with significant infiltration of soil and accompanying embankment/roadway damage.

Footings

Poor: Top portion of footing exposed, but no cracking or breaking off of flakes or chips.

Critical: Footing exposed with signs of cracking or breaking off of flakes or chips. Bottom of footing exposed and/or undercut.

Headwall/Wingwalls

Poor: Cracking or breaking off of flakes or chips affecting >50% of area and/or exposed steel reinforcement. Gap >4" between barrel and wall. Footing exposed and undermined.

Critical: Partially or totally collapsed with damage to embankment/roadway.

Armoring

Poor: Significant displacements, undermining or deterioration affecting the performance of the culvert structure.

Critical: Partially or totally failed, significantly affecting performance and/ or causing embankment/roadway damage or undermining of the culvert barrel or footings.

Apron

Poor: Significant cracking affects >50% of apron. Significant piping or undermining.

Critical: Partially or totally collapsed, significantly affecting performance and/or causing embankment/roadway damage.

Embankment Piping

Poor: Slight pavement cracking above the culvert, perhaps with a noticeable bump/ depression when driving, but no evidence of holes in the embankment or soil infiltration in the culvert barrel.

Critical: Partially or totally failed, significantly affecting performance and/or causing embankment/roadway damage or undermining of the culvert barrel or footings.

GLOSSARY

Appurtenance	Structures, such as aprons, flared end structures, headwalls and wingwalls, that give support to the culvert end or header.
Apron	Erosion protection at the inlet or outlet consisting of rip rap or concrete.
Armoring	Artificial surfacing of a channel bed, bank, or embankment slope to resist scour or erosion.
Bridge	Deck supported by abutments (or stream banks). It may have more than one cell or section separated by one or more piers.
Buoyancy	Water exerting upward pressure on the culvert.
Buried Stream	Segment of stream that flows within a pipe extending well beyond the road crossing. The planned crossing site does not include an inlet and/or outlet, likely because a stream previously in this location has been rerouted, probably underground.
Cascade	The outlet of the structure is raised above the stream bottom at the outlet such that water flows very steeply downward across rock or other hard material when flowing from the structure.
Channel Alignment	Indicates the alignment of the crossing structure relative to the stream at the inlet. Compare the crossing centerline to a centerline of the stream where it enters the crossing.
Corrosion	Deterioration and rusting of metal through oxidation.
Crossing Code	A unique ID for each crossing in the database provided by the assigning authority (NAACC xycode).
Culvert	A culvert consists of a structure buried under some amount of fill. Culverts can be made of stone, brick or masonry.
Delamination	Splitting or separating of concrete or asphalt in the culvert.
Flush	The end of the culvert is not recessed nor does it extend beyond the headwall.
Ford	A ford is a shallow, open stream crossing, in which vehicles pass through the water. Fords may be armored to decrease erosion, and may include pipes to allow flow through the ford (vented ford).
Free Fall	The outlet of the structure is above the stream bottom such that water drops vertically when flowing out of the structure.
Free Fall onto Cascade	The outlet of the structure is raised above the stream bottom at the outlet such that water drops vertically onto a steep area of rock or other hard material, then flows very steeply downward until it reaches the stream.
Headwall	A structure at either end of the culvert whose purpose is to hold back the embankment, retain the culvert and prevent erosion.
Inlet	The in-flow end of the culvert.
Inlet Drop	Water in the stream has a near-vertical drop from the stream channel down into the inlet of the structure. This usually occurs because sediment has accumulated above the inlet.
Lead Observer	Person responsible for data collection and data quality.
Leaching	Water that is penetrating through the culvert and traveling along the outside of the barrel.
Local ID	Identification code assigned by local agency or organization.
Location	Description that will allow another person to locate the culvert using only the supplied information.
Mitered to Slope	The end of the culvert is cut at an angle to match that of the topography.
Multiple Culvert	Two or more adjacent culverts at a single crossing.
No Crossing	A crossing that exists on a map that does not exist in the field.
No Upstream Channel	Areas where water crosses a road through a culvert but no road-stream crossing occurs because there is no channel up-gradient of the road. This can occur at the very headwaters of a stream or where a road crosses a wetland that lacks a stream channel (at least on the up-gradient side).
Outlet	The out-flow end of the culvert.
Overtopping	When the amount of flowing water exceeds the capacity of the culvert and flows over the road surface.
Perched	When the outlet is above the level of the stream bottom causing water leaving the culvert to form a waterfall or cascade.
Recessed	The end of the culvert does not protrude through the headwall, nor is it flush with the headwall.
Removed Crossing	A crossing apparently existed previously at the site but has been removed, so the stream now flows through the site with no provision for vehicles to cross over it.
Scaling	Loss of concrete in thin, plate-like pieces, lamina, or flakes that peel off from a surface due to freeze/thaw.
Scour	Removal of sediment such as sand and gravel from a channel bed or bank caused by swiftly moving water.
Soil Infiltration	Soil entering a culvert through a joint or hole.
Spalling	Breaking or splitting off of surface concrete in chips or bits.
Stream Grade	Elevation at which the water flows.
Substrate/Water Width	The widest width of the water or substrate within a culvert, whichever is wider.
Structural (Longitudinal) Alignment	Pertaining to the horizontal or vertical alignment of the pipe. (Note: do not confuse this with constructed pipe bends).
Wingwall	A short section of wall connected to the side of a headwall used as a retaining wall and to stabilize abutment and guide stream into culvert.

Section 4
Field Form

See attached field form used in the Southampton culvert condition assessments. This form summarizes the data collection fields from the NAACC guides and additional Tighe & Bond / Southampton input described throughout this protocol document.

TOWN OF SOUTHAMPTON, MASSACHUSETTS
CULVERT ASSESSMENT FIELD FORM

CROSSING DATA

Crossing Code:_____ **Date Observed:** (00/00/0000) ____/____/_____ Lead **Observer:**_____

Town:_____ **County:**_____ State:_____ **Stream:**_____

GPS Coordinates: __ __ . __ __ __ __ °N Latitude __ __ . __ __ __ __ °W Longitude Time:_____ Weather:_____

Road_____ **Type** MULTILANE PAVED UNPAVED DRIVEWAY TRAIL RAILROAD

Overall Roadway Condition:	☐ Adequate	☐ Poor	☐ Critical	☐ Unknown	☐ N/A
Roadway Photos:	Photo #:	Description:	Photo #:	Description:	
	Photo #:	Description:	Photo #:	Description:	
Roadway Sketch:					
Roadway Observations:					
Sidewalk Present:	☐ No	☐ Yes	*If yes:* **Sidewalk Location:**	☐ One Side	☐ Both sides
Sidewalk Material:	☐ Asphalt	☐ Granite	☐ Concrete	☐ Other:	
Sidewalk Condition:	☐ Adequate	☐ Poor	☐ Critical	☐ Other:	
Curbing Present:	☐ No	☐ Yes	*If yes:* **Curbing Location:**	☐ One Side	☐ Both sides
Curbing Material:	☐ Asphalt Berm	☐ Granite Curb	☐ Concrete Curb	☐ Other:	
Curbing Condition:	☐ Adequate	☐ Poor	☐ Critical	☐ Other:	
Guardrail Present:	☐ No	☐ Yes	*If yes:* **Guardrail Location:**	☐ One Side	☐ Both sides
Guardrail Condition:	☐ Adequate	☐ Poor	☐ Critical	☐ Other:	
Dimensions:	Pavement width:	_____ft.	____in.	Culvert length:	_____ ft. ____ in.
Crossing Alignment to Roadway:	☐ No Skew	☐ Skewed (< 45º)	☐ Skewed (> 45º)	☐ Unknown	

Crossing Alignment to the Stream: FLOW-ALIGNED SKEWED (>45º)

Crossing Type: ☐Bridge ☐Culvert ☐Multiple Culvert ☐Ford ☐No Crossing ☐Removed Crossing ☐Buried Stream ☐Inaccessible ☐Partially Inaccessible ☐No Upstream Channel

Flow Condition NO FLOW TYPICAL-LOW MODERATE HIGH | **Crossing Condition** OK POOR NEW UNKNOWN

Crossing Comments:

TOWN OF SOUTHAMPTON, MASSACHUSETTS
CULVERT ASSESSMENT FIELD FORM

UPSTREAM			
Number of Barrels:	☐ 1	☐ 2	☐ 3
Distance Between Barrels 1 & 2:		**Distance Between Barrels 2 & 3:**	

Bankfull Width (Optional)_____ **Confidence** ☐ HIGH ☐ LOW/ESTIMATED

Constriction ☐ SEVERE ☐ MODERATE ☐ SPANS ONLY BANKFULL/ ACTIVE CHANNEL ☐ SPANS FULL CHANNEL & BANKS

Scour Present: ☐ No ☐ Yes	*If yes,* ***Location****:*	☐ Culvert	☐ Wingwalls	☐ Footings	
	If yes, **Scour Damage:**	☐ Small	☐ Large		
Headwall Material:	☐ Concrete	☐ Stone	☐ Metal	☐ None	☐ Other:
Wingwall Material:	☐ Concrete	☐ Stone	☐ Metal	☐ None	☐ Other:
Tree Present by Headwall/Wingwall	☐ Yes	☐ No			
Upstream Photos:	Photo #:	Description:	Photo #:	Description:	
	Photo #:	Description:	Photo #:	Description:	

Upstream Sketch/ Observations:

TOWN OF SOUTHAMPTON, MASSACHUSETTS
CULVERT ASSESSMENT FIELD FORM

INLET 1				
Located:	☐ Located	☐ Cannot Locate		
Condition of Upstream Roadway Embankment:	☐ Adequate	☐ Poor	☐ Critical	☐ Unknown

Road Fill Height (Top of culvert to road surface; bridge = 0)_____

Inlet Type ☐ PROJECTING ☐ HEADWALL ☐ WINGWALLS ☐ HEADWALL & WINGWALLS ☐ MITERED TO SLOPE ☐ OTHER ☐ NONE

Inlet Grade (Pick one) ☐ AT STREAM GRADE ☐ INLET DROP ☐ PERCHED ☐ CLOGGED/COLLAPSED/SUBMERGED ☐ UNKNOWN

Inlet Shape: ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 **Inlet Dimensions: A. Width:**____**B. Height:**____**C. Substrate/Water Width:**____**D. Water Depth:**____**E. Abutment Height:**____

Bend Mid-Crossing:	☐ Skewed (< 45º)	☐ Skewed (>45º)	☐ Unknown	☐ None
Inlet Photos:	Photo #:	Description:	Photo #:	Description:
	Photo #:	Description:	Photo #:	Description:
Inlet Sketch/ Observations:				

	INLET *Please check only one level for each item*				
	Adequate	Poor	Critical	Unknown	N/A
Structural (Longitudinal) Alignment	☐	☐	☐	☐	☐
Channel Alignment	☐	☐	☐	☐	☐
Level of Blockage	☐	☐	☐	☐	☐
Flared End Section	☐	☐	☐	☐	☐
Invert Deterioration	☐	☐	☐	☐	☐
Buoyancy or Crushing	☐	☐	☐	☐	☐
Cross-Section Deformation	☐	☐	☐	☐	☐
Structural Integrity of Barrel	☐	☐	☐	☐	☐
Joints and Seams	☐	☐	☐	☐	☐
Footings	☐	☐	☐	☐	☐
Headwall/Wingwalls	☐	☐	☐	☐	☐
Armoring	☐	☐	☐	☐	☐
Apron	☐	☐	☐	☐	☐
Embankment Piping	☐	☐	☐	☐	☐

TOWN OF SOUTHAMPTON, MASSACHUSETTS
CULVERT ASSESSMENT FIELD FORM

INLET 2				
Located:	☐ Located	☐ Cannot Locate		
Condition of Upstream Roadway Embankment:	☐ Adequate	☐ Poor	☐ Critical	☐ Unknown

Road Fill Height (Top of culvert to road surface; bridge = 0)_____

Inlet Type ☐ PROJECTING ☐ HEADWALL ☐ WINGWALLS ☐ HEADWALL & WINGWALLS ☐ MITERED TO SLOPE ☐ OTHER ☐ NONE

Inlet Grade (Pick one) ☐ AT STREAM GRADE ☐ INLET DROP ☐ PERCHED ☐ CLOGGED/COLLAPSED/SUBMERGED ☐ UNKNOWN

Inlet Shape: ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 **Inlet Dimensions: A. Width:**____**B. Height:**____**C. Substrate/Water Width:**____**D. Water Depth:**____**E. Abutment Height:**____

Bend Mid-Crossing:	☐ Skewed (< 45º)	☐ Skewed (>45º)	☐ Unknown	☐ None
Inlet Photos:	Photo #:	Description:	Photo #:	Description:
	Photo #:	Description:	Photo #:	Description:
Inlet Sketch/ Observations:				

	INLET *Please check only one level for each item*				
	Adequate	Poor	Critical	Unknown	N/A
Structural (Longitudinal) Alignment	☐	☐	☐	☐	☐
Channel Alignment	☐	☐	☐	☐	☐
Level of Blockage	☐	☐	☐	☐	☐
Flared End Section	☐	☐	☐	☐	☐
Invert Deterioration	☐	☐	☐	☐	☐
Buoyancy or Crushing	☐	☐	☐	☐	☐
Cross-Section Deformation	☐	☐	☐	☐	☐
Structural Integrity of Barrel	☐	☐	☐	☐	☐
Joints and Seams	☐	☐	☐	☐	☐
Footings	☐	☐	☐	☐	☐
Headwall/Wingwalls	☐	☐	☐	☐	☐
Armoring	☐	☐	☐	☐	☐
Apron	☐	☐	☐	☐	☐
Embankment Piping	☐	☐	☐	☐	☐

TOWN OF SOUTHAMPTON, MASSACHUSETTS
CULVERT ASSESSMENT FIELD FORM

INLET 3				
Located:	☐ Located	☐ Cannot Locate		
Condition of Upstream Roadway Embankment:	☐ Adequate	☐ Poor	☐ Critical	☐ Unknown

Road Fill Height (Top of culvert to road surface; bridge = 0)_____

Inlet Type ☐ PROJECTING ☐ HEADWALL ☐ WINGWALLS ☐ HEADWALL & WINGWALLS ☐ MITERED TO SLOPE ☐ OTHER ☐ NONE

Inlet Grade (Pick one) ☐ AT STREAM GRADE ☐ INLET DROP ☐ PERCHED ☐ CLOGGED/COLLAPSED/SUBMERGED ☐ UNKNOWN

Inlet Shape: ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 **Inlet Dimensions: A. Width:**____**B. Height:**____**C. Substrate/Water Width:**____**D. Water Depth:**____**E. Abutment Height:**____

Bend Mid-Crossing:	☐ Skewed (< 45º)	☐ Skewed (>45º)	☐ Unknown	☐ None
Inlet Photos:	Photo #:	Description:	Photo #:	Description:
	Photo #:	Description:	Photo #:	Description:
Inlet Sketch/ Observations:				

	INLET *Please check only one level for each item*				
	Adequate	Poor	Critical	Unknown	N/A
Structural (Longitudinal) Alignment	☐	☐	☐	☐	☐
Channel Alignment	☐	☐	☐	☐	☐
Level of Blockage	☐	☐	☐	☐	☐
Flared End Section	☐	☐	☐	☐	☐
Invert Deterioration	☐	☐	☐	☐	☐
Buoyancy or Crushing	☐	☐	☐	☐	☐
Cross-Section Deformation	☐	☐	☐	☐	☐
Structural Integrity of Barrel	☐	☐	☐	☐	☐
Joints and Seams	☐	☐	☐	☐	☐
Footings	☐	☐	☐	☐	☐
Headwall/Wingwalls	☐	☐	☐	☐	☐
Armoring	☐	☐	☐	☐	☐
Apron	☐	☐	☐	☐	☐
Embankment Piping	☐	☐	☐	☐	☐

TOWN OF SOUTHAMPTON, MASSACHUSETTS
CULVERT ASSESSMENT FIELD FORM

DOWNSTREAM					
Number of Barrels:	☐ 1	☐ 2	☐ 3		
Distance Between Barrels 1 & 2:		**Distance Between Barrels 2 & 3:**			
Bankfull Width (Optional)_____ **Confidence** ☐ HIGH ☐ LOW/ESTIMATED **Tailwater Scour Pool** ☐ NONE ☐ SMALL ☐ LARGE		**Constriction** ☐ SEVERE ☐ MODERATE ☐ SPANS ONLY BANKFULL/ ACTIVE CHANNEL ☐ SPANS FULL CHANNEL & BANKS			
Headwall Material:	☐ Concrete	☐ Stone	☐ Metal	☐ None	☐ Other:
Wingwall Material:	☐ Concrete	☐ Stone	☐ Metal	☐ None	☐ Other:
Tree Present by Headwall/Wingwall	☐ Yes	☐ No			
Downstream Photos:	Photo #:	Description:	Photo #:	Description:	
	Photo #:	Description:	Photo #:	Description:	
Downstream Sketch/ Observations:					

TOWN OF SOUTHAMPTON, MASSACHUSETTS
CULVERT ASSESSMENT FIELD FORM

OUTLET 1				
Located:	☐ Located	☐ Cannot Locate		
Condition of Downstream Roadway Embankment:	☐ Adequate	☐ Poor	☐ Critical	☐ Unknown

Structure Material ☐ METAL ☐ CONCRETE ☐ PLASTIC ☐ WOOD ☐ ROCK/STONE ☐ FIBERGLASS ☐ COMBINATION

If Combination, describe: Inlet: _____ Outlet: _____

Outlet Shape ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ FORD ☐ UNKNOWN ☐ REMOVED **Outlet Armoring** ☐ NONE ☐ NOT EXTENSIVE ☐ EXTENSIVE

Outlet Grade (Pick one) ☐ AT STREAM GRADE ☐ FREE FALL ☐ CASCADE ☐ FREE FALL ONTO CASCADE ☐ CLOGGED/COLLAPSED/SUBMERGED ☐ UNKNOWN

Outlet Dimensions A. Width_____.___ B. Height_____.___ C. Substrate/Water Width_____.___ D. Water Depth_____.___

Outlet Drop to Water Surface_____.___ **Outlet Drop to Stream Bottom**_____.___ **E. Abutment Height** (Type 7 bridges only)_____.___

Road Fill Height (Top of culvert to road surface; bridge = 0)_____

Outlet Photos:	Photo #:	Description:	Photo #:	Description:
	Photo #:	Description:	Photo #:	Description:

Outlet Sketch/ Observations:

	OUTLET *Please check only one level for each item*				
	Adequate	Poor	Critical	Unknown	N/A
Structural (Longitudinal) Alignment	☐	☐	☐	☐	☐
Channel Alignment	☐	☐	☐	☐	☐
Level of Blockage	☐	☐	☐	☐	☐
Flared End Section	☐	☐	☐	☐	☐
Invert Deterioration	☐	☐	☐	☐	☐
Buoyancy or Crushing	☐	☐	☐	☐	☐
Cross-Section Deformation	☐	☐	☐	☐	☐
Structural Integrity of Barrel	☐	☐	☐	☐	☐
Joints and Seams	☐	☐	☐	☐	☐
Footings	☐	☐	☐	☐	☐
Headwall/Wingwalls	☐	☐	☐	☐	☐
Armoring	☐	☐	☐	☐	☐
Apron	☐	☐	☐	☐	☐
Embankment Piping	☐	☐	☐	☐	☐

TOWN OF SOUTHAMPTON, MASSACHUSETTS
CULVERT ASSESSMENT FIELD FORM

OUTLET 2

Located: ☐ Located ☐ Cannot Locate

Condition of Downstream Roadway Embankment: ☐ Adequate ☐ Poor ☐ Critical ☐ Unknown

Structure Material ☐ METAL ☐ CONCRETE ☐ PLASTIC ☐ WOOD ☐ ROCK/STONE ☐ FIBERGLASS ☐ COMBINATION

If Combination, describe: Inlet: _____ Outlet: _____

Outlet Shape ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ FORD ☐ UNKNOWN ☐ REMOVED **Outlet Armoring** ☐ NONE ☐ NOT EXTENSIVE ☐ EXTENSIVE

Outlet Grade (Pick one) ☐ AT STREAM GRADE ☐ FREE FALL ☐ CASCADE ☐ FREE FALL ONTO CASCADE ☐ CLOGGED/COLLAPSED/SUBMERGED ☐ UNKNOWN

Outlet Dimensions A. Width_____.___ B. Height_____.___ C. Substrate/Water Width_____.___ D. Water Depth_____.___

Outlet Drop to Water Surface_____.___ **Outlet Drop to Stream Bottom**_____.___ **E. Abutment Height** (Type 7 bridges only)_____.___

Road Fill Height (Top of culvert to road surface; bridge = 0)_____

Outlet Photos: Photo #: Description: Photo #: Description:

Photo #: Description: Photo #: Description:

Outlet Sketch/
Observations:

	OUTLET *Please check only one level for each item*				
	Adequate	Poor	Critical	Unknown	N/A
Structural (Longitudinal) Alignment	☐	☐	☐	☐	☐
Channel Alignment	☐	☐	☐	☐	☐
Level of Blockage	☐	☐	☐	☐	☐
Flared End Section	☐	☐	☐	☐	☐
Invert Deterioration	☐	☐	☐	☐	☐
Buoyancy or Crushing	☐	☐	☐	☐	☐
Cross-Section Deformation	☐	☐	☐	☐	☐
Structural Integrity of Barrel	☐	☐	☐	☐	☐
Joints and Seams	☐	☐	☐	☐	☐
Footings	☐	☐	☐	☐	☐
Headwall/Wingwalls	☐	☐	☐	☐	☐
Armoring	☐	☐	☐	☐	☐
Apron	☐	☐	☐	☐	☐
Embankment Piping	☐	☐	☐	☐	☐

TOWN OF SOUTHAMPTON, MASSACHUSETTS
CULVERT ASSESSMENT FIELD FORM

OUTLET 3				
Located:	☐ Located	☐ Cannot Locate		
Condition of Downstream Roadway Embankment:	☐ Adequate	☐ Poor	☐ Critical	☐ Unknown

Structure Material ☐ METAL ☐ CONCRETE ☐ PLASTIC ☐ WOOD ☐ ROCK/STONE ☐ FIBERGLASS ☐ COMBINATION

If Combination, describe: Inlet: _____ Outlet: _____

Outlet Shape ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ FORD ☐ UNKNOWN ☐ REMOVED **Outlet Armoring** ☐ NONE ☐ NOT EXTENSIVE ☐ EXTENSIVE

Outlet Grade (Pick one) ☐ AT STREAM GRADE ☐ FREE FALL ☐ CASCADE ☐ FREE FALL ONTO CASCADE ☐ CLOGGED/COLLAPSED/SUBMERGED ☐ UNKNOWN

Outlet Dimensions A. Width_____.____ B. Height_____.____ C. Substrate/Water Width_____.____ D. Water Depth_____.____

Outlet Drop to Water Surface_____.____ **Outlet Drop to Stream Bottom**_____.____ **E. Abutment Height** (Type 7 bridges only)_____.____

Road Fill Height (Top of culvert to road surface; bridge = 0)_____

Outlet Photos:	Photo #:	Description:	Photo #:	Description:
	Photo #:	Description:	Photo #:	Description:

Outlet Sketch/ Observations:

	OUTLET *Please check only one level for each item*				
	Adequate	Poor	Critical	Unknown	N/A
Structural (Longitudinal) Alignment	☐	☐	☐	☐	☐
Channel Alignment	☐	☐	☐	☐	☐
Level of Blockage	☐	☐	☐	☐	☐
Flared End Section	☐	☐	☐	☐	☐
Invert Deterioration	☐	☐	☐	☐	☐
Buoyancy or Crushing	☐	☐	☐	☐	☐
Cross-Section Deformation	☐	☐	☐	☐	☐
Structural Integrity of Barrel	☐	☐	☐	☐	☐
Joints and Seams	☐	☐	☐	☐	☐
Footings	☐	☐	☐	☐	☐
Headwall/Wingwalls	☐	☐	☐	☐	☐
Armoring	☐	☐	☐	☐	☐
Apron	☐	☐	☐	☐	☐
Embankment Piping	☐	☐	☐	☐	☐

TOWN OF SOUTHAMPTON, MASSACHUSETTS
CULVERT ASSESSMENT FIELD FORM

OPERATION AND MAINTENANCE CONCERNS:					
Potential Illicit Discharge Observed:	☐ Yes	☐ No			
Illicit Discharge Location:	☐ Nearby Outfall Upstream	☐ Nearby Outfall Downstream	☐ Observed at Inlet	☐ Observed at Outlet	☐ Unknown
Illicit Discharge Evidence:	☐ Odor ☐ Suds ☐ Yard Waste	☐ Floatables (not including trash) ☐ Deposits or Staining ☐ Excessive Vegetation or Benthic Growth		☐ Trash ☐ Oil ☐ Discoloration of Flow	☐ Other
Beaver Dam Near Crossing:	☐ Yes	☐ No			
Beaver Dam Location:	☐ Near Inlet	☐ Near Outlet	☐ Unknown		
Beaver Dam Distance from Crossing:					

AQUATIC PASSABILITY ASSESSMENT ADDITIONAL CONDITIONS:

Internal Structures ☐ NONE ☐ BAFFLES/WEIRS ☐ SUPPORTS ☐ OTHER_____

Structure Substrate Matches Stream ☐ NONE ☐ COMPARABLE ☐ CONTRASTING ☐ NOT APPROPRIATE ☐ UNKNOWN

Structure Substrate Type (Pick one) ☐ NONE ☐ SILT ☐ SAND ☐ GRAVEL ☐ COBBLE ☐ BOULDER ☐ BEDROCK ☐ UNKNOWN

Structure Substrate Coverage ☐ NONE ☐ 25% ☐ 50% ☐ 75% ☐ 100% ☐ UNKNOWN

Physical Barriers (Pick all that apply) ☐ NONE ☐ DEBRIS/SEDIMENT/ROCK ☐ DEFORMATION ☐ FREE FALL ☐ FENCING ☐ DRY ☐ OTHER

Severity (Choose carefully based on barrier type(s) above) ☐ NONE ☐ MINOR ☐ MODERATE ☐ SEVERE **Location:** _____

Water Depth Matches Stream ☐ YES ☐ NO-SHALLOWER ☐ NO-DEEPER ☐ UNKNOWN ☐ DRY

Water Velocity Matches Stream ☐ YES ☐ NO-FASTER ☐ NO-SLOWER ☐ UNKNOWN ☐ DRY

Dry Passage through Structure? ☐ YES ☐ NO ☐ UNKNOWN

Comments

Field Recommendations – Is further action required?	☐ None	☐ Maintenance	☐ Rehabilitation	☐ Replacement

Performance Problems Requiring Action

Debris/Veg Blockage >1/3 of rise ☐	Local Outlet Scour ☐	Embankment Slope Instability ☐
Sediment Blockage >1/2 the opening ☐	Previous and/or Frequent Overtopping ☐	No Access/Ends Totally Buried/Submerged ☐
Buoyancy or Crushing-Related Inlet Failure ☐	Embankment Piping ☐	Aggressive Abrasion/Corrosion/Chemical ☐
Poor Channel Alignment ☐	Channel Degradation/Headcut ☐	Exposed Footing (Open-Bottom Culvert Only) ☐

Appendix C
Culvert Assessment Summary Sheets

Southampton Culvert Assessment Form

Submitted By: Tighe&Bond April 9, 2024 8:04 AM

Culvert ID: Brickyard-1	**Road name:** Brickyard Rd	**Stream:**
Weather:		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 3″	**Structure Length:** 36′ 9″
Road Observations: Some settlement at outlet end visible on roadway	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Upstream ponding

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 4″ **Inlet Height:** 1′ 2″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 0′ 0″
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Critical **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 1″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Critical***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Critical***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Poor***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: Small
Notes on Downstream: No stream. Water spreads out into land

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1′ 6″ **Outlet Height:** 1′ 6″
Crossing Dimensions			
Road Fill Height: 1′ 6″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 4″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 4″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Poor*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Critical*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Last 15 ft is newer plastic pipe.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** No - Faster
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

Road Photos

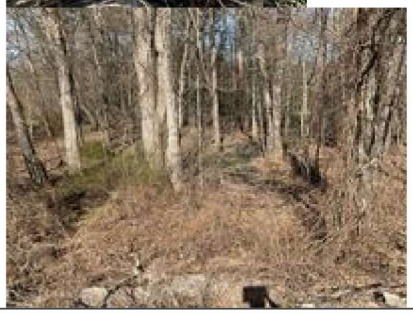


Upstream Photos



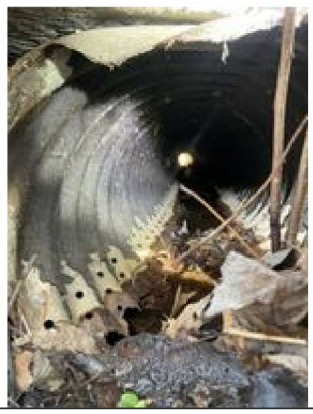
Downstream Embankment Photo

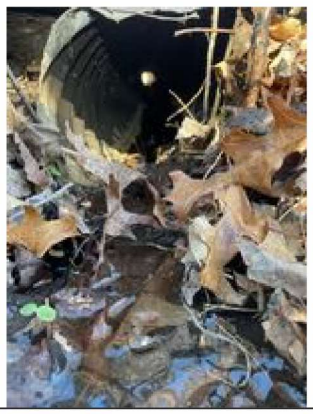


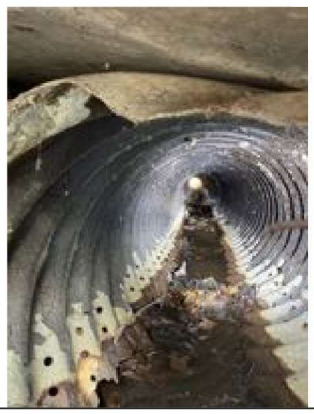


Crossing Inlet Photo

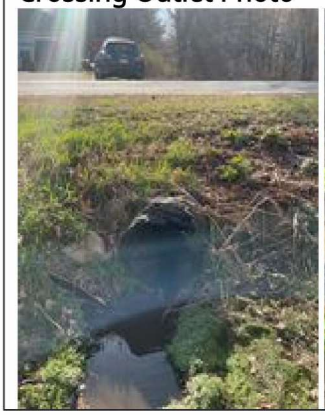








Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 26, 2024 8:41 AM

Culvert ID: Brickyard-2	**Road name:** Brickyard road	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Unpaved	**Condition:** Adequate
Pavement Width: 14′ 0″	**Structure Length:** 20′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 7′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 4″ **Inlet Height:** 1′ 1″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 0′ 0″	
Inlet Type: None **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Critical **Armoring/Riprap Condition:** NA	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 0′ 10″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 8′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Spans only bankfull/active channel

Tailwater Scour Pool: None
Notes on Downstream:

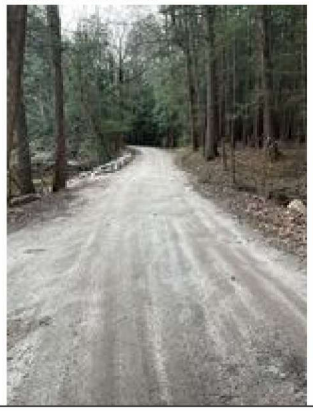
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall onto cascade	**Outlet Width:** 1′ 5″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 2′ 0″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 1′ 0″ **Water Depth:** 1′ 1″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 8″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Poor*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: 2′+ of outlet invert is eroded, full section loss.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing:	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Contrasting	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: Debris/Sediment/Rock	**Physical Barrier Severity:** Minor	**Physical Barrier Location:** In pipe
Dry Passage through Structure? No		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

Road Photos





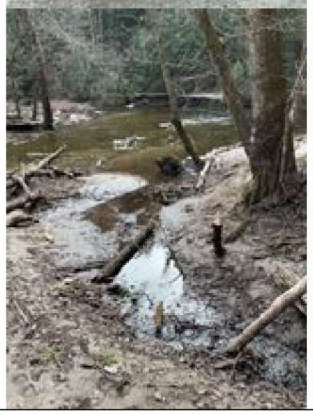
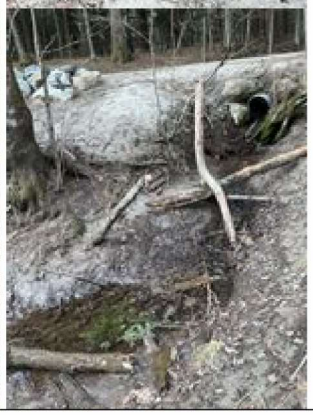
Upstream Photos





Downstream Embankment Photo



Crossing Inlet Photo







Crossing Outlet Photo






Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 26, 2024 7:56 AM

Culvert ID: Brickyard-3	**Road name:** Brickyard Rd	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Unpaved	**Condition:** Adequate
Pavement Width: 14′ 6″	**Structure Length:** 24′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 12′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 3 - Open Bottom Arch Bridge/Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 12 ′ 0″ **Inlet Height:** 6′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″
Inlet Type: Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Critical **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 12′ 0″ **Water Depth:** 3′ 3″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***Unknown***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Tree very close to inlet

Downstream Area

Downstream Channel Bankfull Width: 12′ 6″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Spans only bankfull/active channel

Tailwater Scour Pool: Small
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 3 - Open Bottom Arch Bridge/Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 12′ 0″ **Outlet Height:** 6′ 0″
Crossing Dimensions			
Road Fill Height: 2′ 2″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 12′ 0″ **Water Depth:** 3′ 3″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***Unknown*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers:	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

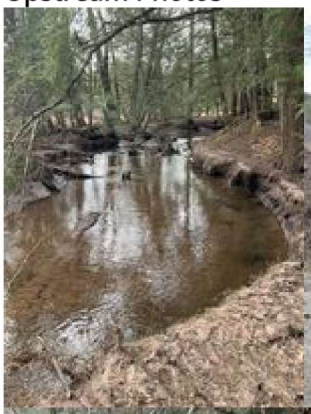
Photo Log

Road Photos

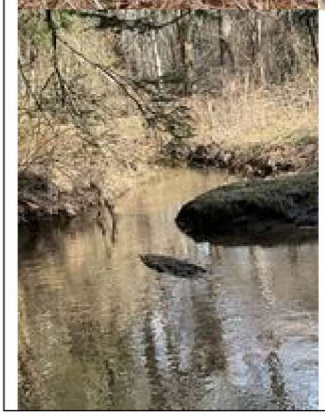





Upstream Photos







Downstream Embankment Photo



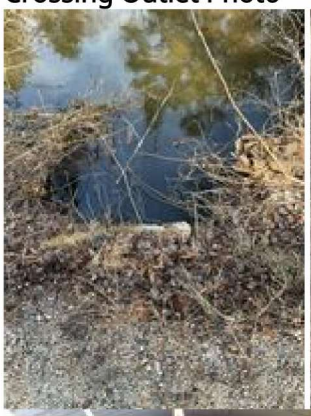


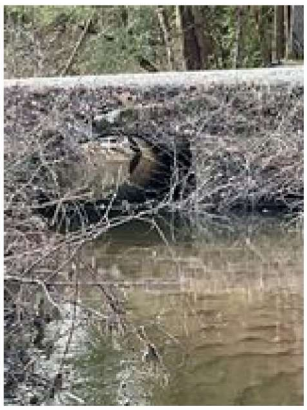
Crossing Inlet Photo





Crossing Outlet Photo




Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 22, 2024 2:18 PM

Culvert ID: Brickyard-4	**Road name:** Brickyard rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 17′ 0″	**Structure Length:** 80′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (>45)	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** Blockage>75% at outlet

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** No defined stream. Roadway runoff

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 7″ **Inlet Height:** 1′ 6″

Crossing Dimensions

Bend Mid-Crossing: Skewed (<45)	**Road Fill Height:** 0′ 0″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream: beside and under portion of chicken coop. No defined bank.

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 6″ **Outlet Height:** 0′ 6″
Crossing Dimensions			
Road Fill Height: 1′ 6″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Critical*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Critical***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Cannot see all the way through			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: Dry	**Physical Barrier Severity:** Minor	**Physical Barrier Location:**
Dry Passage through Structure? Yes		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** Sediment Blockage > 1/2 the opening, Aggressive Abrasion/Corrosion/Chemical, Buoyancy or Crushing-Related Inltet Failure	**Comments:**

Photo Log

Road Photos





Upstream Photos




Downstream Embankment Photo

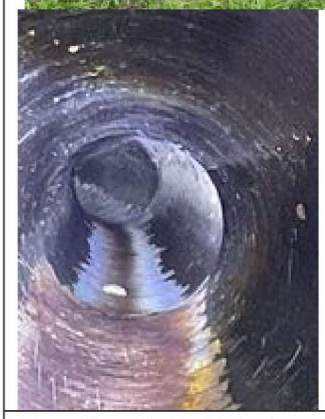




Crossing Inlet Photo







Crossing Outlet Photo






Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 22, 2024 1:43 PM

Culvert ID: Brickyard-5	**Road name:** Brickyard rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Poor
Pavement Width: 20′ 0″	**Structure Length:** 60′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** Deteriorated and crushed with blockage at outlet.

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Retention pond at inlet dry

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 0′ 10″ **Inlet Height:** 0′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Critical***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Critical**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Crushed and deteriorated made it difficult to see through pipe and get good picture1

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate
Tailwater Scour Pool: None	
Notes on Downstream: No defined channel	

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 0′ 11″ **Outlet Height:** 0′ 5″
Crossing Dimensions			
Road Fill Height: 3′ 3″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Critical*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: More than half full with sediment and dry			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** 75%	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: Debris/Sediment/Rock, Dry	**Physical Barrier Severity:** Moderate	**Physical Barrier Location:** Along 10-20 feet of outlet
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Sediment Blockage > 1/2 the opening, Aggressive Abrasion/Corrosion/Chemical, Buoyancy or Crushing-Related Inltet Failure	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo



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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 29, 2024 7:32 AM

Culvert ID: Clark-2	**Road name:** Clark st	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 22′ 0″	**Structure Length:** 100′ 0″
Road Observations: Guardrail posts are detached in several locations	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Poor

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 12′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 4′ 2″ **Inlet Height:** 4′ 2″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 25′ 25″	
Inlet Type: Headwall & Wingwalls **Headwall Material:** Stone **Wingwall Material:** Stone, Concrete	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** Adequate	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 2′ 8″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Critical***	Armoring: ***Adequate***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Bottom of culvert fully deteriorated. Natural streambed below.

Downstream Area

Downstream Channel Bankfull Width: 12′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Large
Notes on Downstream: Large pool at end of free fall several feet deep

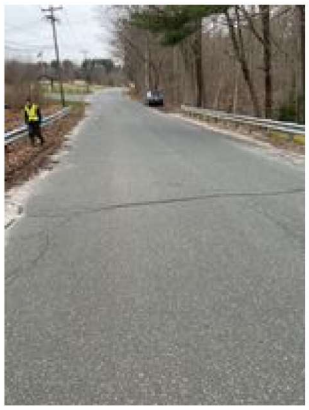
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 4′ 2″ **Outlet Height:** 5′ 5″
Crossing Dimensions			
Road Fill Height: 28′ 0″			
Headwall Material: None **Wingwall Material:** Stone		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 2′ 6″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 1′ 1″ **Outlet Drop to Stream Bottom:** 1′ 8″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Poor*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Rusted and deteriorated bottom creating freefall			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Cobble **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:**	**Comments:**

Photo Log

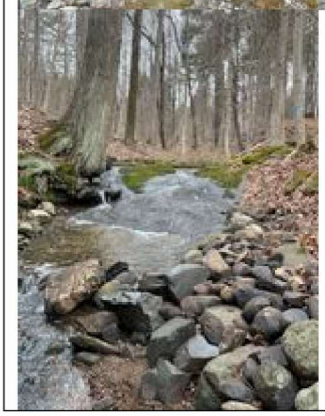
Road Photos




Upstream Photos





Downstream Embankment Photo





Crossing Inlet Photo







Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 1:33 PM

Culvert ID: ColdSpring-1	**Road name:** Cold spring road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 33′ 6″	**Structure Length:** 87′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 12′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 5′ 0″ **Inlet Height:** 5′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 5′ 5″	
Inlet Type: Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 3′ 2″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 10′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Large
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 5′ 0″ **Outlet Height:** 5′ 0″
Crossing Dimensions			
Road Fill Height: 7′ 6″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 2′ 8″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 2′ 5″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

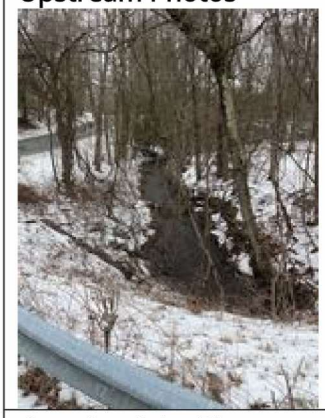
Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo





Crossing Inlet Photo







Crossing Outlet Photo







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Submitted By: Tighe&Bond April 5, 2024 12:11 PM

Culvert ID: ColdSpring-2	**Road name:** Cold spring rd	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 32′ 0″	**Structure Length:** 52′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 12′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Farmland very wet

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 0″ **Inlet Height:** 2′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 4′ 4″
Inlet Type: Headwall **Headwall Material:** Stone **Wingwall Material:** Stone	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 10″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Unknown***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Critical***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 12′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Small
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Clogged/collapsed/submerged	**Outlet Width:** 2′ 0″ **Outlet Height:** 1′ 6″

Crossing Dimensions	
Road Fill Height: 5′ 4″	
Headwall Material: Stone **Wingwall Material:** None	**Embankment Condition:** Adequate
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2′ 0″ **Water Depth:** 1′ 1″	**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Adequate*** Level of Blockage: ***Unknown*** Flared End Section: ***Critical*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***	Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Unknown***
Crossing Outlet Observations: Outlet is submerged. Not clearly visible in photo. There is a drain pipe in front	

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

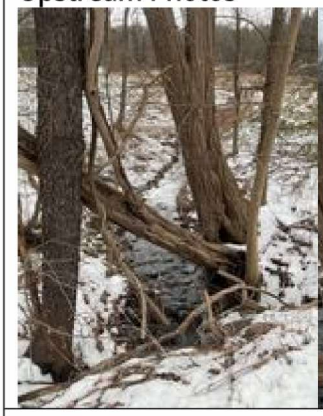
Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

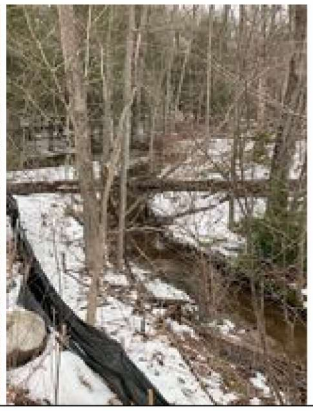
Road Photos




Upstream Photos




Downstream Embankment Photo

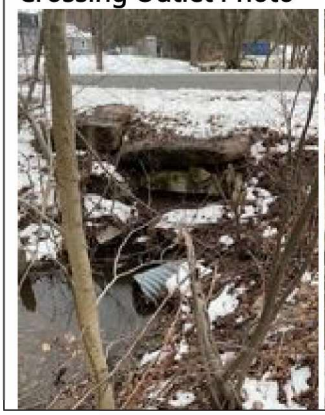



Crossing Inlet Photo






Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 8:48 AM

Culvert ID: Coleman-1	**Road name:** Coleman rd	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Poor
Pavement Width: 26′ 0″	**Structure Length:** 71′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:** Also has roadside drainage runoff stream. Outlet is deteriorated at projecting outlet

Upstream Area

Approximate Bank full Width: 16′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 8″ **Inlet Height:** 1′ 6″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** Concrete, None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 6″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 7′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Large	
Notes on Downstream: Meandering stream in wetlands	

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1′ 9″ **Outlet Height:** 4′ 8″
Crossing Dimensions			
Road Fill Height: 3′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 8″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 2′ 2″ **Outlet Drop to Stream Bottom:** 7′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Corroded pipe invert with severe scour pool from free fall water			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos




Upstream Photos




Downstream Embankment Photo




Crossing Inlet Photo

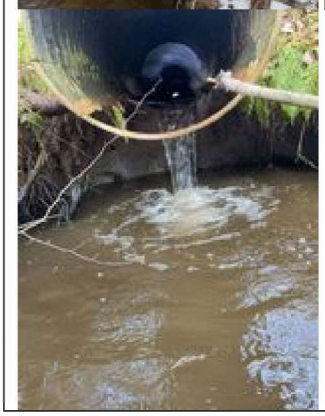





Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 2:19 PM

Culvert ID: Coleman-2	**Road name:** Coleman road	**Stream:**
Weather: Rain		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 26′ 0″	**Structure Length:** 41′ 0″
Road Observations: Crack in pavement along culvert length	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: No Flow	**Crossing Comments:** Pump and water pipe upstream to pump water from pond through culvert.

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Spans full channel & banks	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 0″ **Inlet Height:** 1′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Critical **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream** **Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Poor***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Streambed

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Spans full channel & banks
Tailwater Scour Pool: None	
Notes on Downstream:	

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 0″ **Outlet Height:** 1′ 0″
Crossing Dimensions			
Road Fill Height: 2′ 6″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***NA*** Level of Blockage: ***Adequate*** Flared End Section: ***Poor*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Dry af, leads to tiny pipe 10′ away			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? Yes		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos

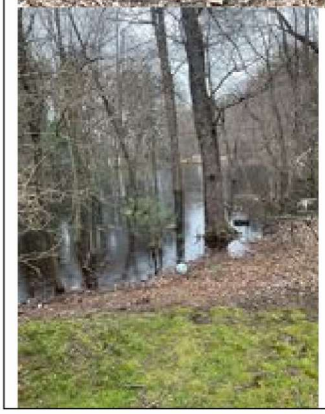




Upstream Photos







Downstream Embankment Photo





Crossing Inlet Photo





Crossing Outlet Photo




Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 2:01 PM

Culvert ID: Coleman-3	**Road name:** Coleman road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 26′ 0″	**Structure Length:** 40′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 5′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 4″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 2″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 8′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 4″ **Outlet Height:** 1′ 1″
Crossing Dimensions			
Road Fill Height: 3′ 10″			
Headwall Material: Stone **Wingwall Material:** Stone		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 3″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Poor*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Critical*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

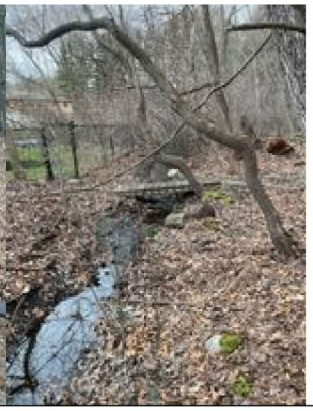
Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

Road Photos




Upstream Photos

Downstream Embankment Photo




Crossing Inlet Photo






Crossing Outlet Photo






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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 9:19 AM

Culvert ID: Cook-1	**Road name:** Cook road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 25′ 0″	**Structure Length:** 39′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Both ends are completely submerged

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 2 **Observations:** Wetland upstream
Distance Between Culvert Barrels: 2′ 0″	

Crossing Inlet - Barrel 1- Cannot Locate - Sediment obstruction

Inlet Shape:	**Inlet Grade:**	**Inlet Width:** 2′ 6″ **Inlet Height:** 1′ 0″

Crossing Dimensions

Bend Mid-Crossing:	**Road Fill Height:** ′ ″
Inlet Type: **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 2′ 6″ **Water Depth:** 1′ 1″	**Tree Present by Upstream** **Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***
Channel Alignment: ***Poor***
Level of Blockage: ***Critical***
Flared End Section: ***NA***
Invert Deterioration: ***Unknown***
Buoyancy or Crushing: **Unknown**
Cross-Section Deformation: ***Unknown***
Structural Integrity of Barrel: ***Unknown***
Joints and Seams: ***Unknown***
Footings: ***NA***
Headwall/Wingwalls: ***NA***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Unknown***

Inlet Observations:

Crossing Inlet - Barrel 2- Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Clogged/Collapsed/Submerged	**Inlet Width:** 2′ 6″ **Inlet Height:** 1′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 2′ 6″ **Water Depth:** 1′ 1″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Unknown***	Structural Integrity of Barrel: ***Unknown***
Channel Alignment: ***Poor***	Joints and Seams: ***Unknown***
Level of Blockage: ***Poor***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Unknown**	Apron: ***NA***
Cross-Section Deformation: ***Unknown***	Embankment Piping: ***Unknown***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 2 **Constriction:** Moderate

Tailwater Scour Pool: Small

Distance Between Culvert Barrels: 2′ ″

Notes on Downstream:

Crossing Outlet - Barrel 1 - Located -

Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Clogged/collapsed/submerged	**Outlet Width:** 2′ 0″ **Outlet Height:** 1′ 2″

Crossing Dimensions

Road Fill Height: 3′ 0″

Headwall Material: None **Wingwall Material:** None	**Embankment Condition:** Critical
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2′ 0″ **Water Depth:** 1′ 1″	**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″

Outlet Condition:

Structural (Longitudinal) Alignment: ***Unknown***	Cross-Section Deformation: ***Unknown***
Channel Alignment: ***Poor***	Structural Integrity of Barrel: ***Unknown***
Level of Blockage: ***Unknown***	Joints and Seams: ***Unknown***
Flared End Section: ***NA***	Footings: ***NA***
Invert Deterioration: ***Unknown***	Headwall/Wingwalls: ***NA***
Buoyancy or Crushing: ***Unknown***	Apron: ***NA***
	Embankment Piping: ***Unknown***

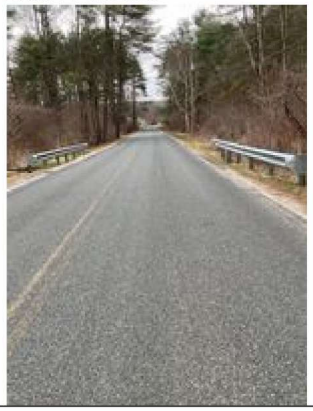
Crossing Outlet Observations: Completely submerged			
Crossing Outlet - Barrel 2 - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Clogged/collapsed/submerged	**Outlet Width:** 2′ 4″ **Outlet Height:** 1′ 4″
Crossing Dimensions			
Road Fill Height: 3′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2′ 4″ **Water Depth:** 1′ 1″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Poor*** Level of Blockage: ***Unknown*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***		Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Crossing Outlet Observations: Completely submerged			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** 50%	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** Unknown
Physical Barriers: Debris/Sediment/Rock	**Physical Barrier Severity:** Severe	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Sediment Blockage > 1/2 the opening, Previous and/or Frequent Overtopping, Channel Degradation/Headcut, Embankment Slope Instability, No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

Road Photos






Upstream Photos

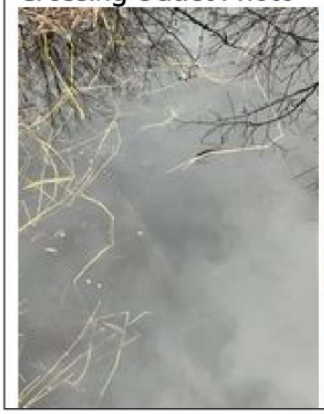


Downstream Embankment Photo




Crossing Inlet Photo

Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond September 10, 2024 4:27 PM

Culvert ID: Cottage-1	**Road name:** Cottage Ave.	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 17′ 6″	**Structure Length:** 20′ 0″
Road Observations: Sediment/sand along roadway by inlet and outlet	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Multiple Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** Culverts crushed/deformed at outlet. Significant sediment build up. RCP 3-4' downstream of outlet. Area known for flooding.

Upstream Area

Approximate Bank full Width: 3′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 2 **Observations:** Defined channel with a lot of vegetation. Channel runs along private properties.

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 3″ **Inlet Height:** 1′ 1″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Critical***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Partially blocked as you go further towards outlet.

Downstream Area

Downstream Channel Bankfull Width: 3′ 6″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 2 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: RCP 30" 3-4 downstream for a distance of 15-20', then terminates into an open channel on private property (Westfield side). The open channel flows into a similar RCP downstream that crosses under Birch Rd.	

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 5″ **Outlet Height:** 0′ 8″
Crossing Dimensions			
Road Fill Height: 0′ 10″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Critical*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Critical***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Crushed and deformed at outlet. However, pipe appears to be in satisfactory just inside the outlet. Potential for rehab for short term repair.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Contrasting	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** 75%	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: Debris/Sediment/Rock, Deformation, Dry	**Physical Barrier Severity:** Severe	**Physical Barrier Location:** outlet and partially at inlet
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Sediment Blockage > 1/2 the opening, Aggressive Abrasion/Corrosion/Chemical, Buoyancy or Crushing-Related Inltet Failure	**Comments:**

Photo Log

Road Photos




Upstream Photos





Downstream Embankment Photo







Crossing Inlet Photo







Crossing Outlet Photo









Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 8:30 AM

Culvert ID: County-1	**Road name:** County road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 24′ 0″	**Structure Length:** 55′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	One Side		Adequate

Crossing Alignment to Roadway: Skewed (>45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 10′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Densely vegetated upstream

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 0″ **Inlet Height:** 2′ 0″

Crossing Dimensions

Bend Mid-Crossing:	**Road Fill Height:** 4′ 4″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 8″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Drain along road feeds into pipe

Downstream Area

Downstream Channel Bankfull Width: 10′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 0″ **Outlet Height:** 1′ 11″
Crossing Dimensions			
Road Fill Height: 4′ 7″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 5″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 15, 2024 2:17 PM

Culvert ID: CrookedLedge-1	**Road name:** Crooked ledge road	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Unpaved	**Condition:** Critical
Pavement Width: 21′ 0″	**Structure Length:** 38′ 0″
Road Observations: Gravel/dirt roadway has water runoff	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetlands

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 0′ 0″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: Unknown	**Road Fill Height:** 3′ 3″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 1′ 1″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Unknown***	Structural Integrity of Barrel: ***Unknown***
Channel Alignment: ***Adequate***	Joints and Seams: ***Unknown***
Level of Blockage: ***Critical***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Unknown**	Apron: ***NA***
Cross-Section Deformation: ***Unknown***	Embankment Piping: ***Unknown***

Inlet Observations: Almost completely submerged with water brush and dirt. Could not confirm some dims

Downstream Area

Downstream Channel Bankfull Width: 10′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream: many logs from nearby tree that was cut were placed over outlet (not clear if this was intentional).

Crossing Outlet - Cannot Locate - Debris, Heavy Brush			
Structure Material:	**Outlet Shape:**	**Outlet Grade:**	**Outlet Width:** ' " **Outlet Height:** ' "
Crossing Dimensions			
Road Fill Height: ' "			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:**	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** ' " **Water Depth:** ' "		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ' " **Outlet Drop to Stream Bottom:** ' "	
Outlet Condition: Structural (Longitudinal) Alignment: Channel Alignment: Level of Blockage: Flared End Section: Invert Deterioration: Buoyancy or Crushing:		Cross-Section Deformation: Structural Integrity of Barrel: Joints and Seams: Footings: Headwall/Wingwalls: Apron: Embankment Piping:	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ' "
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: Debris/Sediment/Rock	**Physical Barrier Severity:** Severe	**Physical Barrier Location:**
Dry Passage through Structure? Unknown		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Sediment Blockage > 1/2 the opening, Channel Degradation/Headcut, No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

Road Photos





Upstream Photos



Downstream Embankment Photo









Crossing Inlet Photo







Crossing Outlet Photo

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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 15, 2024 8:34 AM

Culvert ID: CrookedLedge-3	**Road name:** Crooked lane road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Unpaved	**Condition:** Critical
Pavement Width: 14′ 0″	**Structure Length:** 22′ 0″
Road Observations: Gravel road	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Submerged

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Pond

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** ′ ″ **Inlet Height:** 4′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Critical **Armoring/Riprap Condition:** Unknown	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** ′ ″ **Water Depth:** 3′ 3″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Unknown***	Structural Integrity of Barrel: ***Unknown***
Channel Alignment: ***Adequate***	Joints and Seams: ***Unknown***
Level of Blockage: ***Unknown***	Footings: ***Unknown***
Flared End Section: ***Unknown***	Headwall/Wingwalls: ***Unknown***
Invert Deterioration: ***Unknown***	Armoring: ***Unknown***
Buoyancy or Crushing: **Unknown**	Apron: ***NA***
Cross-Section Deformation: ***Unknown***	Embankment Piping: ***Unknown***

Inlet Observations: Almost completely submerged. Many dims could not be verified.

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream: Pond

Crossing Outlet - Cannot Locate - High water			
Structure Material:	**Outlet Shape:**	**Outlet Grade:**	**Outlet Width:** ' " **Outlet Height:** ' "
Crossing Dimensions			
Road Fill Height: ' "			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:**	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** ' " **Water Depth:** ' "		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ' " **Outlet Drop to Stream Bottom:** ' "	
Outlet Condition: Structural (Longitudinal) Alignment: Channel Alignment: Level of Blockage: Flared End Section: Invert Deterioration: Buoyancy or Crushing:		Cross-Section Deformation: Structural Integrity of Barrel: Joints and Seams: Footings: Headwall/Wingwalls: Apron: Embankment Piping:	
Crossing Outlet Observations:			

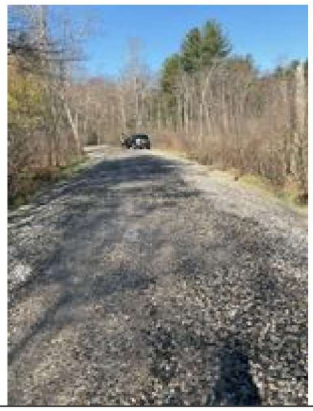
Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ' "
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: Fencing	**Physical Barrier Severity:** Moderate	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Embankment Slope Instability, No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

Road Photos



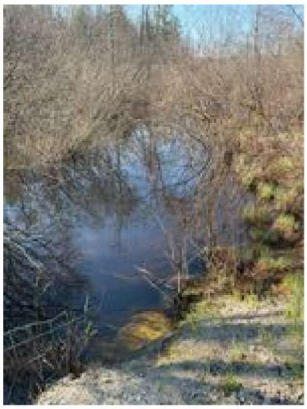


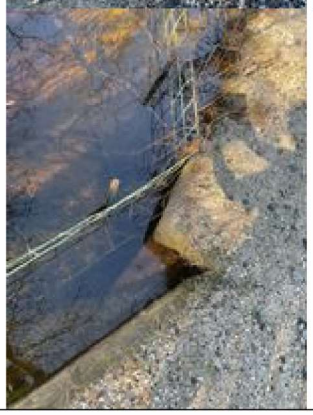
Upstream Photos



Downstream Embankment Photo







Crossing Inlet Photo



Crossing Outlet Photo

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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 15, 2024 8:09 AM

Culvert ID: CrookedLedge-4	**Road name:** Crooked lane road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Critical
Pavement Width: 20′ 0″	**Structure Length:** 39′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetlands

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 2″ **Inlet Height:** 1′ 1″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 2″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Critical***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream: Wetlands

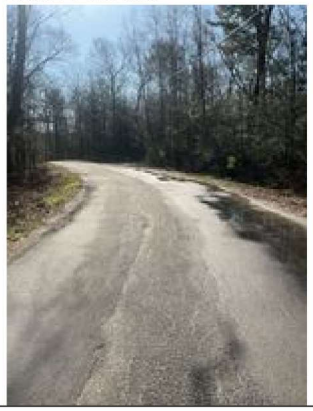
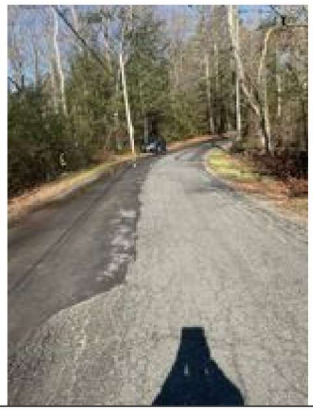
Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 2″ **Outlet Height:** 0′ 11″
Crossing Dimensions			
Road Fill Height: 1′ 8″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 5″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***		Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Crossing Outlet Observations: Almost submerged. Water width is taken at top			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Deeper **Water Velocity Matches Stream:** Unknown
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

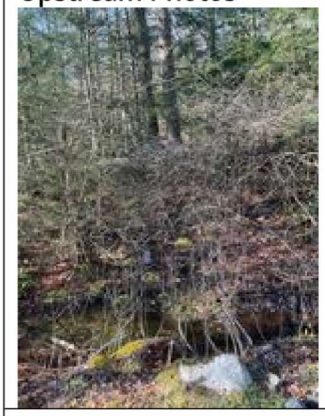
Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

Road Photos

Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo






Crossing Outlet Photo



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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 15, 2024 7:37 AM

Culvert ID: CrookedLedge-6	**Road name:** Crooked ledge road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 22′ 6″	**Structure Length:** 43′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 6′ 6″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Upstream comes from small drainage pipe

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 3″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: Skewed (<45)	**Road Fill Height:** 0′ 0″
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 4″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 6′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: Small
Notes on Downstream:

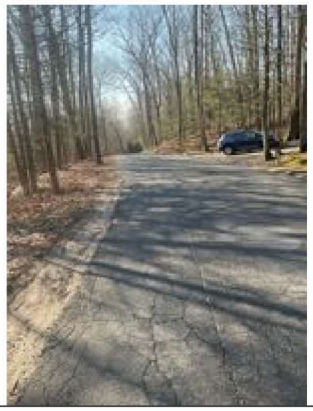
Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1′ 5″ **Outlet Height:** 1′ 6″
Crossing Dimensions			
Road Fill Height: 2′ 8″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 9″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 1′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** No - Faster
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos

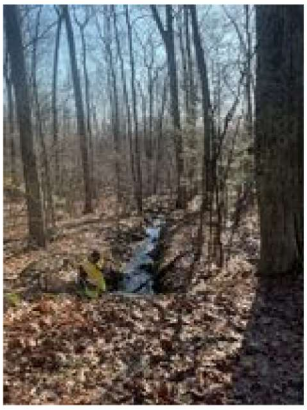
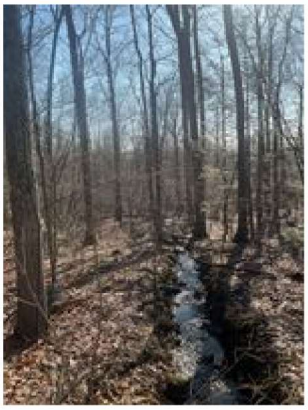



Upstream Photos





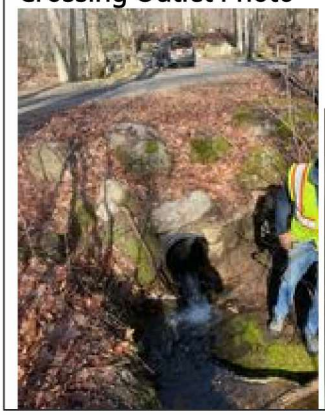
Downstream Embankment Photo

Crossing Inlet Photo




Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 15, 2024 8:55 AM

Culvert ID: Delisle-1	**Road name:** Delisle road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 19′ 6″	**Structure Length:** 55′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Multiple Culvert	**Crossing Condition:** OK
Flow Condition: Moderate	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 16′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 2 **Observations:** Reservoir
Distance Between Culvert Barrels: 2′ 8″	

Crossing Inlet - Barrel 1- Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 6′ 0″ **Inlet Height:** 6′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 0′ 0″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 4′ 0″ **Water Depth:** 1′ 1″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***
Channel Alignment: ***Adequate***
Level of Blockage: ***Adequate***
Flared End Section: ***NA***
Invert Deterioration: ***Poor***
Buoyancy or Crushing: **Adequate**
Cross-Section Deformation: ***Adequate***
Structural Integrity of Barrel: ***Adequate***
Joints and Seams: ***Adequate***
Footings: ***NA***
Headwall/Wingwalls: ***NA***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Adequate***

Inlet Observations:

Crossing Inlet - Barrel 2- Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 6′ 0″ **Inlet Height:** 5′ 11″

Crossing Dimensions		
Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 2′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Minor dent at bottom

Downstream Area	
Downstream Channel Bankfull Width: 18′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 2 **Constriction:** Moderate

Tailwater Scour Pool: Small

Distance Between Culvert Barrels: 3′ 3″

Notes on Downstream:

Crossing Outlet - Barrel 1 - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 5′ 11″ **Outlet Height:** 6′ 1″

Crossing Dimensions	
Road Fill Height: 2′ 0″	
Headwall Material: None **Wingwall Material:** None	**Embankment Condition:** Poor
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 3′ 4″ **Water Depth:** 0′ 0″	**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 11″

Outlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Cross-Section Deformation: ***Adequate***
Channel Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Level of Blockage: ***Adequate***	Joints and Seams: ***Adequate***
Flared End Section: ***NA***	Footings: ***NA***
Invert Deterioration: ***Adequate***	Headwall/Wingwalls: ***NA***
Buoyancy or Crushing: ***Adequate***	Apron: ***NA***
	Embankment Piping: ***Adequate***

Crossing Outlet Observations:

Crossing Outlet - Barrel 2 - Located -

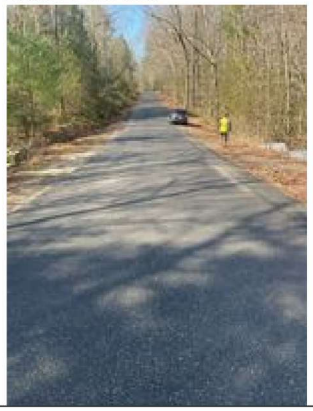
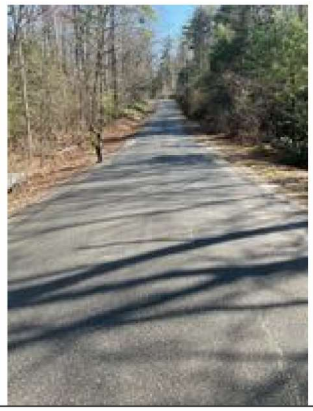
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 6′ 0″ **Outlet Height:** 6′ 0″
Crossing Dimensions			
Road Fill Height: 2′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2′ 8″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: Yes	**Location:** Near Inlet	**Distance From Crossing:** 100′ 0″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

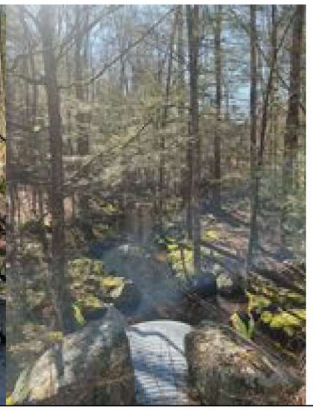
Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

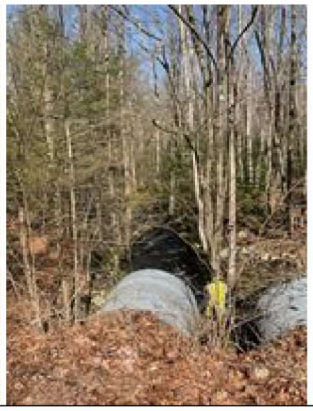
Road Photos

Upstream Photos

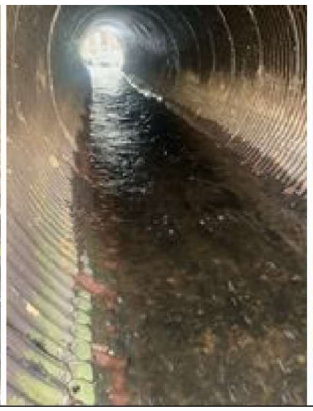
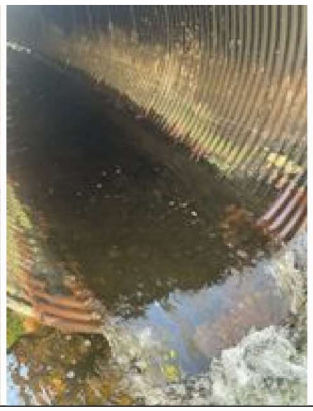
Downstream Embankment Photo

Crossing Inlet Photo




Crossing Outlet Photo


Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 21, 2024 7:13 AM

Culvert ID: Douglas-1	**Road name:** Douglas road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Critical
Pavement Width: 12′ 6″	**Structure Length:** 19′ 6″
Road Observations: Road is busier than expected in morning due to business at the end of the road.	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Moderate	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 2 **Observations:** No established bank, wetland
Distance Between Culvert Barrels: 0′ 6″	

Crossing Inlet - Barrel 1- Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 6″ **Inlet Height:** 1′ 6″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 0′ 0″
Inlet Type: Wingwalls **Headwall Material:** None **Wingwall Material:** Stone	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 4″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Poor***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Poor***	Embankment Piping: ***Adequate***

Inlet Observations: Partially clogged, simple maintenance

Crossing Inlet - Barrel 2- Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 6″ **Inlet Height:** 1′ 5″

Crossing Dimensions		
Bend Mid-Crossing: None	**Road Fill Height:** 0′ 0″	
Inlet Type: Wingwalls **Headwall Material:** None **Wingwall Material:** Stone	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 6″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***
Channel Alignment: ***Adequate***
Level of Blockage: ***Poor***
Flared End Section: ***NA***
Invert Deterioration: ***Poor***
Buoyancy or Crushing: **Adequate**
Cross-Section Deformation: ***Poor***
Structural Integrity of Barrel: ***Adequate***
Joints and Seams: ***NA***
Footings: ***NA***
Headwall/Wingwalls: ***Adequate***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area	
Downstream Channel Bankfull Width: 4′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 2 **Constriction:** Moderate

Tailwater Scour Pool: Small

Distance Between Culvert Barrels: 0′ 6″

Notes on Downstream:

Crossing Outlet - Barrel 1 - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Cascade	**Outlet Width:** 1′ 6″ **Outlet Height:** 1′ 6″

Crossing Dimensions	
Road Fill Height: 1′ 1″	
Headwall Material: None **Wingwall Material:** Stone	**Embankment Condition:** Critical
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 10″ **Water Depth:** 0′ 0″	**Abutment Height (Type 7 Bridges Only):** 0′ 0″ **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 6″

Outlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***
Channel Alignment: ***Adequate***
Level of Blockage: ***Adequate***
Flared End Section: ***NA***
Invert Deterioration: ***Critical***
Buoyancy or Crushing: ***Adequate***
Cross-Section Deformation: ***Adequate***
Structural Integrity of Barrel: ***Poor***
Joints and Seams: ***NA***
Footings: ***NA***
Headwall/Wingwalls: ***Adequate***
Apron: ***NA***
Embankment Piping: ***Adequate***

Crossing Outlet Observations:

Crossing Outlet - Barrel 2 - Located -

Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Cascade	**Outlet Width:** 1′ 6″ **Outlet Height:** 1′ 5″
Crossing Dimensions			
Road Fill Height: 1′ 2″			
Headwall Material: None **Wingwall Material:** Stone		**Embankment Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 8″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** 0′ 0″ **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 3″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Poor***		Cross-Section Deformation: ***Poor*** Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Not Appropriate	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Local Outlet Scour, Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

Road Photos




Upstream Photos





Downstream Embankment Photo






Crossing Inlet Photo






Crossing Outlet Photo







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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 21, 2024 10:17 AM

Culvert ID: Douglas-2	**Road name:** Douglas Road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Poor
Pavement Width: 14’ 6”	**Structure Length:** 31’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (>45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** Culvert inlet is not visible

Upstream Area

Approximate Bank full Width: 1’ 0” **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** No stream. Flow through buried Cmp, excavated along 15’ of stream

Crossing Inlet - Cannot Locate - Debris, Heavy Brush, Partial Collapse

Inlet Shape:	**Inlet Grade:**	**Inlet Width:** ’ ” **Inlet Height:** ’ ”

Crossing Dimensions

Bend Mid-Crossing:	**Road Fill Height:** ’ ”
Inlet Type: **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** **Armoring/Riprap Condition:**

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** ’ ” **Water Depth:** ’ ”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment:	Structural Integrity of Barrel:
Channel Alignment:	Joints and Seams:
Level of Blockage:	Footings:
Flared End Section:	Headwall/Wingwalls:
Invert Deterioration:	Armoring:
Buoyancy or Crushing:	Apron:
Cross-Section Deformation:	Embankment Piping:

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 1’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: Small
Notes on Downstream: Outlet leads to wetlands

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Clogged/collapsed/submerged	**Outlet Width:** 1′ 0″ **Outlet Height:** 0′ 9″

Crossing Dimensions	
Road Fill Height: 2′ 0″	
Headwall Material: Stone **Wingwall Material:** None	**Embankment Condition:** Poor
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 10″ **Water Depth:** 0′ 0″	**Abutment Height (Type 7 Bridges Only):** 0′ 0″ **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Adequate*** Level of Blockage: ***Poor*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Critical***	Cross-Section Deformation: ***Critical*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Unknown***
Crossing Outlet Observations: Outlet is completely submerged and corroded.	

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 50%	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: Debris/Sediment/Rock, Deformation	**Physical Barrier Severity:** Severe	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Sediment Blockage > 1/2 the opening, Channel Degradation/Headcut, Embankment Slope Instability, Aggressive Abrasion/Corrosion/Chemical, Buoyancy or Crushing-Related Inltet Failure, No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

Road Photos




Upstream Photos



Downstream Embankment Photo




Crossing Inlet Photo

Crossing Outlet Photo



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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 29, 2024 9:43 AM

Culvert ID: East-2	**Road name:** East st	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 22′ 0″	**Structure Length:** 50′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 0″ **Inlet Height:** 2′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 5′ 5″
Inlet Type: Projecting, Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 4″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Poor***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Poor***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Plastic flared end is separated from steel corrugated pipe

Downstream Area

Downstream Channel Bankfull Width: 9′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Rock/Stone	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 0″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 7′ 0″			
Headwall Material: Stone **Wingwall Material:** Stone		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 1′ 8″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Critical*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Steel flared end has eroded and several feet downstream. No more flared end			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:**	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Maintenance **Performance Problems Requiring Action:**	**Comments:** Little substrate along bottom

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo



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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 29, 2024 11:26 AM

Culvert ID: East-3	**Road name:** East St	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23′ 0″	**Structure Length:** 3′ 7″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetlands

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 4″ **Inlet Height:** 1′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 4′ 4″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 4″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Unknown***
Channel Alignment: ***Adequate***	Joints and Seams: ***Unknown***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Unknown***	Embankment Piping: ***Adequate***

Inlet Observations: Difficult to see due to high water level

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream: Wetlands

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Clogged/collapsed/submerged	**Outlet Width:** 1′ 6″ **Outlet Height:** 0′ 7″
Crossing Dimensions			
Road Fill Height: 3′ 4″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 6″ **Water Depth:** 1′ 1″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Adequate*** Level of Blockage: ***Unknown*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***		Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Crossing Outlet Observations: Completely submerged and difficult to field measure width			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** No - Deeper **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** No Access/Ends Totally Buried/Submerged	**Comments:**

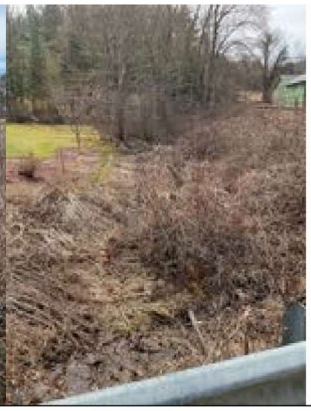
Photo Log

Road Photos

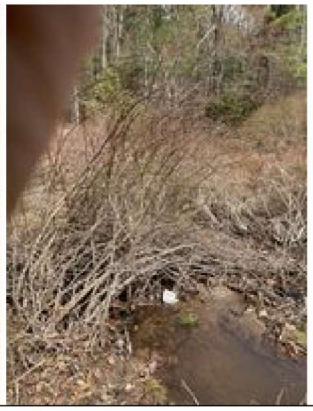





Upstream Photos

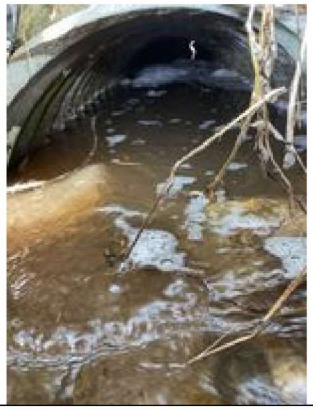



Downstream Embankment Photo

Crossing Inlet Photo





Crossing Outlet Photo






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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 29, 2024 12:30 PM

Culvert ID: East-4	**Road name:** East st	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23′ 0″	**Structure Length:** 43′ 0″
Road Observations: Guardrail bent towards head wall at inlet	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 12′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Inlet Drop	**Inlet Width:** 5′ 8″ **Inlet Height:** 5′ 10″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 8′ 8″
Inlet Type: Headwall & Wingwalls **Headwall Material:** Concrete **Wingwall Material:** Concrete	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 2′ 8″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 16′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Large
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Cascade	**Outlet Width:** 5′ 8″ **Outlet Height:** 5′ 10″
Crossing Dimensions			
Road Fill Height: 10′ 0″			
Headwall Material: Concrete **Wingwall Material:** Concrete		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2′ 8″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 1′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Critical*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos






Upstream Photos





Downstream Embankment Photo





Crossing Inlet Photo






Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 7:29 AM

Culvert ID: East-5	**Road name:** East street	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Poor
Pavement Width: 23′ 0″	**Structure Length:** 36′ 8″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 2′ 6″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 0″ **Inlet Height:** 1′ 8″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″	
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 8″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:**	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: Small
Notes on Downstream: Leads to pond

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Cascade	**Outlet Width:** 1′ 11″ **Outlet Height:** 2′ 5″
Crossing Dimensions			
Road Fill Height: 5′ 0″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 7″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 1′ 1″ **Outlet Drop to Stream Bottom:** 1′ 6″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: 6′ from the end entails near complete invert deterioration leading to cantilever type bend			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Local Outlet Scour, Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

Road Photos






Upstream Photos





Downstream Embankment Photo






Crossing Inlet Photo







Crossing Outlet Photo






Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 8:01 AM

Culvert ID: East-6	**Road name:** East street	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 6″	**Structure Length:** 36′ 9″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Spans full channel & banks	**Number of Barrels:** 1 **Observations:** Tree farm uphill. No steam.

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 6″ **Inlet Height:** 1′ 5″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″	
Inlet Type: Projecting, Headwall **Headwall Material:** Concrete **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 8″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***NA***	Joints and Seams: ***Poor***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: There seems to be a corroded seam farther in. No channel but a trickle of water goes in from damp soil.

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Spans full channel & banks

Tailwater Scour Pool: Small
Notes on Downstream: Wetlands. Area seems to flood

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 6″ **Outlet Height:** 1′ 6″
Crossing Dimensions			
Road Fill Height: 2′ 4″			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 1″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***NA*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Deeper **Water Velocity Matches Stream:** No - Faster
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 15, 2024 1:24 PM

Culvert ID: Fomer-1	**Road name:** Fomer road	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Unpaved	**Condition:** Poor
Pavement Width: 13′ 6″	**Structure Length:** 21′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetlands

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 6″ **Inlet Height:** 1′ 5″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 4″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Poor***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Large
Notes on Downstream: Wetlands

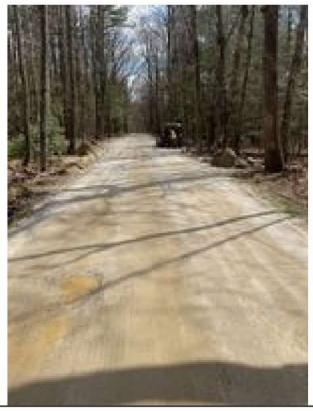
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 10″ **Outlet Height:** 1′ 3″
Crossing Dimensions			
Road Fill Height: 2′ 11″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 10″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Critical***		Cross-Section Deformation: ***Critical*** Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Crushed from headwalls stones and deteriorated steel			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

Road Photos

Upstream Photos




Downstream Embankment Photo

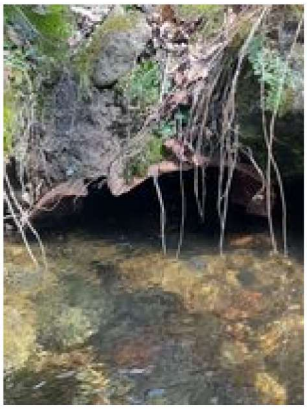


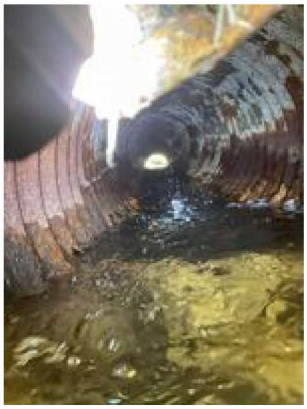

Crossing Inlet Photo






Crossing Outlet Photo




Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 9, 2024 1:46 PM

Culvert ID: Fomer-17	**Road name:** Fomer rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 29′ 0″	**Structure Length:** 68′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☑ Yes ☐ No	Both Sides	Asphalt Berm	Adequate
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 12′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 9″ **Inlet Height:** 1′ 8″

Crossing Dimensions

Bend Mid-Crossing: Skewed (<45)	**Road Fill Height:** 2′ 2″	
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** Adequate	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 11″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Critical***	Armoring: ***Adequate***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 9′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

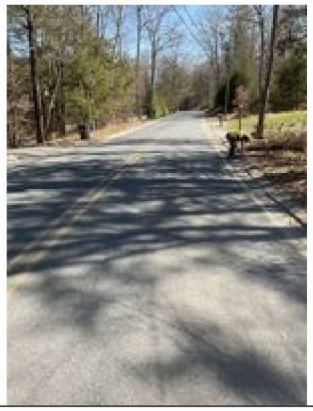
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 2′ 0″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 5′ 0″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 1′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 9″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

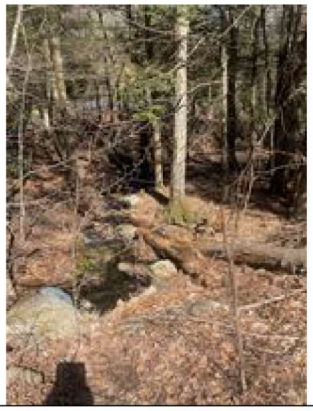
Road Photos



Upstream Photos

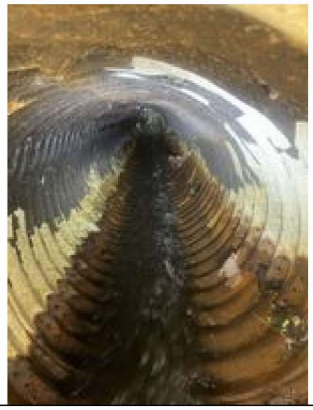


Downstream Embankment Photo



Crossing Inlet Photo

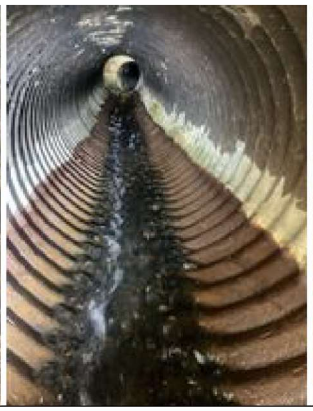






Crossing Outlet Photo







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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 9, 2024 1:14 PM

Culvert ID: Fomer-19	**Road name:** Fomer rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 28′ 0″	**Structure Length:** 100′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (>45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 14′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 2″ **Inlet Height:** 2′ 6″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 4′ 4″
Inlet Type: Projecting, Headwall & Wingwalls **Headwall Material:** Stone **Wingwall Material:** Stone	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** Adequate

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 8″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Poor***	Armoring: ***Adequate***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 12′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Small
Notes on Downstream:

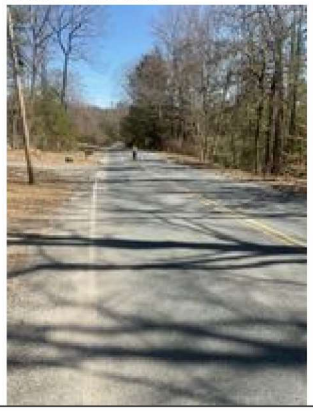
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 2′ 6″ **Outlet Height:** 2′ 6″
Crossing Dimensions			
Road Fill Height: 6′ 4″			
Headwall Material: Stone **Wingwall Material:** Stone		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 6″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 8″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



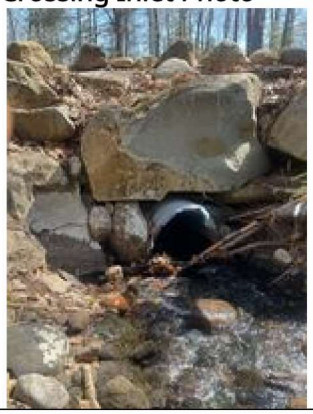
Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



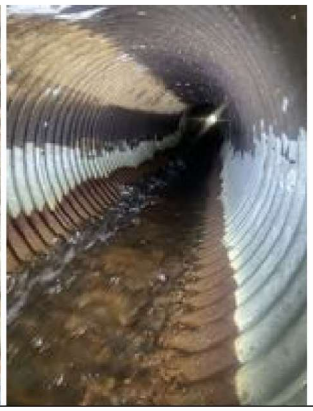






Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 15, 2024 1:53 PM

Culvert ID: Fomer-2	**Road name:** Fomer road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Unpaved	**Condition:** Adequate
Pavement Width: 18′ 0″	**Structure Length:** 60′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	One Side		Critical

Crossing Alignment to Roadway: Unknown	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Removed Crossing	**Crossing Condition:** Unknown
Flow Condition: No Flow	**Crossing Comments:** Culvert seemingly blocked off by large stones. Both ends cannot be seen and almost completely dry

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Spans only bankfull/active channel	**Number of Barrels:** 1 **Observations:** Inlet looks to be covered by soil

Crossing Inlet - Cannot Locate - Sediment obstruction

Inlet Shape:	**Inlet Grade:**	**Inlet Width:** ′ ″ **Inlet Height:** ′ ″

Crossing Dimensions

Bend Mid-Crossing:	**Road Fill Height:** ′ ″
Inlet Type: **Headwall Material:** Stone **Wingwall Material:** Stone	**Embankment Condition:** **Armoring/Riprap Condition:**

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** ′ ″ **Water Depth:** ′ ″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment:	Structural Integrity of Barrel:
Channel Alignment:	Joints and Seams:
Level of Blockage:	Footings:
Flared End Section:	Headwall/Wingwalls:
Invert Deterioration:	Armoring:
Buoyancy or Crushing:	Apron:
Cross-Section Deformation:	Embankment Piping:

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Spans only bankfull/active channel
Tailwater Scour Pool: None	
Notes on Downstream: Large rocks completely block any opening if there still is one. Small trickle of water at bottom which leads to wetlands	

Crossing Outlet - Cannot Locate - Debris			
Structure Material:	**Outlet Shape:**	**Outlet Grade:**	**Outlet Width:** ′ ″ **Outlet Height:** ′ ″
Crossing Dimensions			
Road Fill Height: ′ ″			
Headwall Material: Concrete **Wingwall Material:** Concrete		**Embankment Condition:**	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** ′ ″ **Water Depth:** ′ ″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ′ ″ **Outlet Drop to Stream Bottom:** ′ ″	
Outlet Condition: Structural (Longitudinal) Alignment: Channel Alignment: Level of Blockage: Flared End Section: Invert Deterioration: Buoyancy or Crushing:		Cross-Section Deformation: Structural Integrity of Barrel: Joints and Seams: Footings: Headwall/Wingwalls: Apron: Embankment Piping:	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: Debris/Sediment/Rock, Deformation	**Physical Barrier Severity:** Severe	**Physical Barrier Location:** Everywhere
Dry Passage through Structure? Unknown		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo

Crossing Outlet Photo

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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 9, 2024 12:32 PM

Culvert ID: Fomer-20	**Road name:** Fomer rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 27′ 0″	**Structure Length:** 61′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 8′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Stream surrounded by wetland upstream

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Perched	**Inlet Width:** 1′ 5″ **Inlet Height:** 1′ 5″

Crossing Dimensions

Bend Mid-Crossing: Skewed (<45)	**Road Fill Height:** 5′ 5″
Inlet Type: Projecting, Headwall, Wingwalls **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Large	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Water going under culvert. No water visible inside culvert. Pipe is about 1″ over water level

Downstream Area

Downstream Channel Bankfull Width: 13′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Large
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1′ 5″ **Outlet Height:** 1′ 5″
Crossing Dimensions			
Road Fill Height: 6′ 3″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 5″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 1′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Two pipes. One has mid bend at catchbasin. Other is unknown and water is stagnant			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Local Outlet Scour, Aggressive Abrasion/Corrosion/Chemical	**Comments:** Inlet culvert is above water level

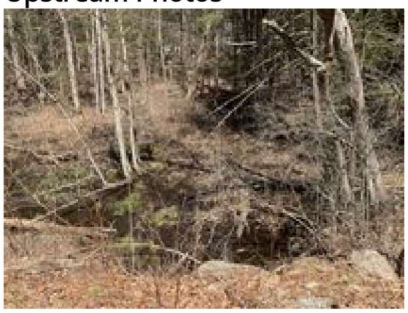
Photo Log

Road Photos

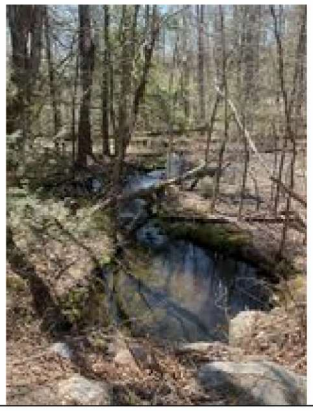




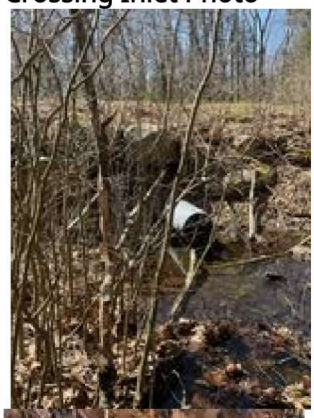
Upstream Photos



Downstream Embankment Photo



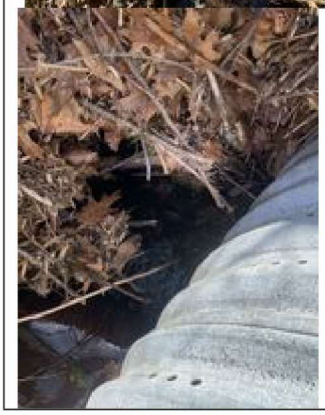
Crossing Inlet Photo



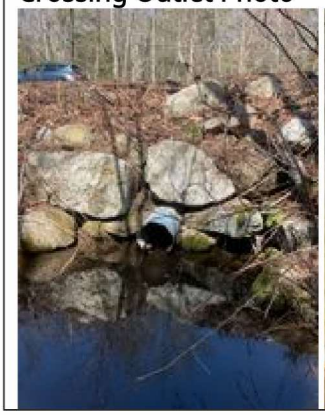








Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 8, 2024 3:22 PM

Culvert ID: Fomer-21	**Road name:** Fomer road	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 27′ 0″	**Structure Length:** 52′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (>45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Moderate	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 14′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 9′ 0″ **Inlet Height:** 7′ 1″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** Adequate

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Large	**Substrate/Water Width:** 8′ 1″ **Water Depth:** 1′ 1″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Adequate***	Armoring: ***Adequate***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 19′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream:

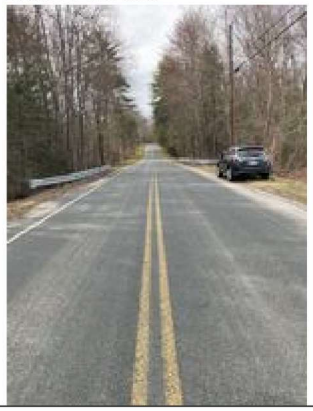
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 2 - Pipe Arch/Elliptical Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 9′ 0″ **Outlet Height:** 6′ 4″
Crossing Dimensions			
Road Fill Height: 2′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 8′ 6″ **Water Depth:** 1′ 1″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

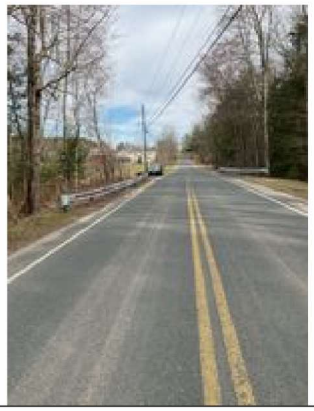
Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos

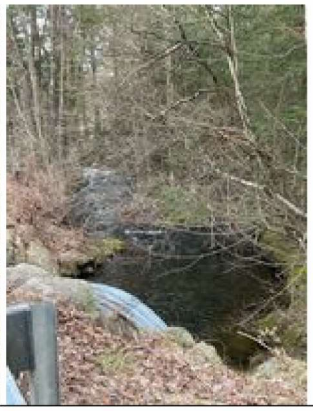


Upstream Photos




Downstream Embankment Photo

Crossing Inlet Photo






Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 8, 2024 3:04 PM

Culvert ID: Fomer-22	**Road name:** Fomer road	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 28′ 0″	**Structure Length:** 44′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Wetlands

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 6″ **Inlet Height:** 1′ 6″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″	
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Large	**Substrate/Water Width:** 1′ 6″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Unknown***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Hdpe inside rusted corrugated steel pipe

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Small
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 0″ **Outlet Height:** 1′ 11″
Crossing Dimensions			
Road Fill Height: 2′ 0″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 10″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Plastic pipe from inlet ends at mid section, steel pipe rest of the way			

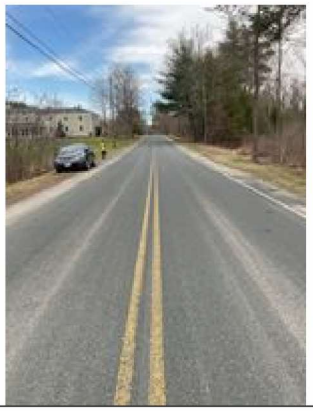
Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** No - Faster
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Aggressive Abrasion/Corrosion/Chemical	**Comments:**

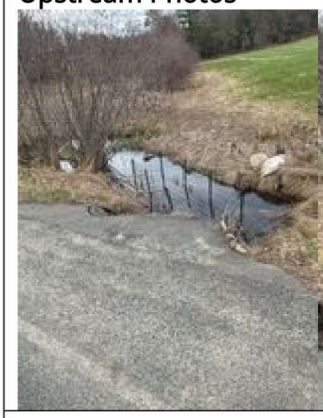
Photo Log

Road Photos






Upstream Photos




Downstream Embankment Photo



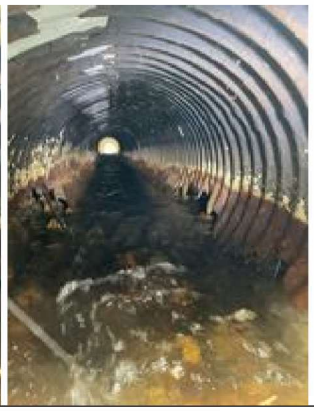

Crossing Inlet Photo






Crossing Outlet Photo



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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 8, 2024 1:59 PM

Culvert ID: Fomer-23	**Road name:** Fomer road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 25′ 0″	**Structure Length:** 42′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Wetlands

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 10″ **Inlet Height:** 1′ 10″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 5″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Poor***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 5′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Small
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 9″ **Outlet Height:** 1′ 7″
Crossing Dimensions			
Road Fill Height: 2′ 7″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 4″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***Critical*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Outlet invert so deteriorated impossible to measure water width and depth inside pipe. Completely disconnected at assumed joint 3′ in			

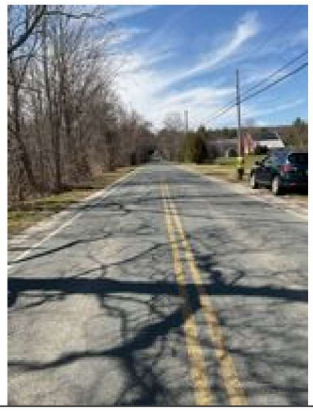
Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: Deformation	**Physical Barrier Severity:** Severe	**Physical Barrier Location:** 3′ in outlet
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Local Outlet Scour, Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

Road Photos





Upstream Photos







Downstream Embankment Photo

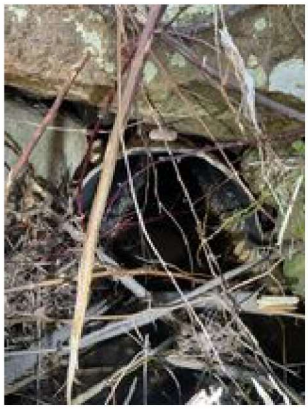
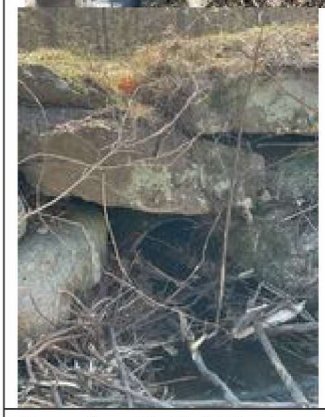






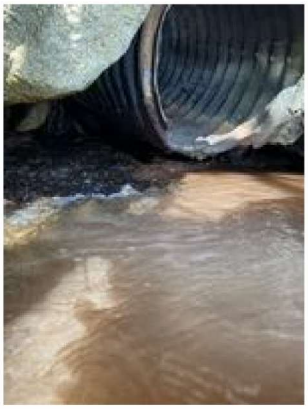
Crossing Inlet Photo

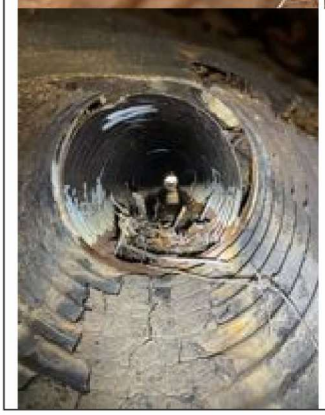


Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 15, 2024 10:40 AM

Culvert ID: Fomer-4	**Road name:** Fomer road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Unpaved	**Condition:** Critical
Pavement Width: 14′ 0″	**Structure Length:** 20′ 0″
Road Observations: Lot of potholes and ruts	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetland split to two streams. Bank full could not be measured

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 8″ **Inlet Height:** 1′ 6″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 3″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Poor***	Embankment Piping: ***Adequate***

Inlet Observations: Headwall Stone above inlet is crushing it

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream: Wetlands

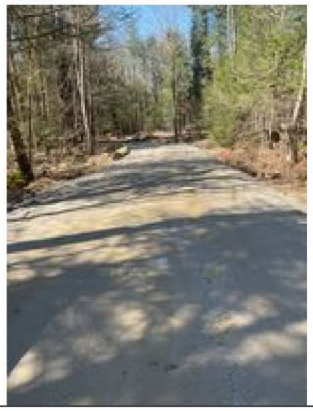
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 11″ **Outlet Height:** 1′ 7″
Crossing Dimensions			
Road Fill Height: 2′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 3″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Poor***		Cross-Section Deformation: ***Critical*** Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Embankment Slope Instability, Aggressive Abrasion/Corrosion/Chemical, Buoyancy or Crushing-Related Inltet Failure	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo











Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 15, 2024 12:18 PM

Culvert ID: Fomer-5	**Road name:** Fomer rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Unpaved	**Condition:** Critical
Pavement Width: 13′ 0″	**Structure Length:** 19′ 6″
Road Observations: Roadway embankment failure. Culvert exposed along road shoulder	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** End is crushed from apparent vehicle impact

Upstream Area

Approximate Bank full Width: 3′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Roadway drainage stream

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 0′ 0″ **Inlet Height:** 0′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 0′ 0″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Critical **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream** **Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Unknown***	Structural Integrity of Barrel: ***Unknown***
Channel Alignment: ***Critical***	Joints and Seams: ***Unknown***
Level of Blockage: ***Critical***	Footings: ***NA***
Flared End Section: ***Unknown***	Headwall/Wingwalls: ***Unknown***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Unknown**	Apron: ***NA***
Cross-Section Deformation: ***Unknown***	Embankment Piping: ***Unknown***

Inlet Observations: Covered with debris and some substrate. Unable to confirm dimensions. Input 0 for unknowns. Water was flowing though pipe.

Downstream Area

Downstream Channel Bankfull Width: 5′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream:	

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1′ 1″ **Outlet Height:** 0′ 4″
Crossing Dimensions			
Road Fill Height: 0′ 6″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Adequate*** Level of Blockage: ***Unknown*** Flared End Section: ***Unknown*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Critical***		Cross-Section Deformation: ***Critical*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Crossing Outlet Observations: Crushed from vehicle impact. Water coming though bottom of pipe.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: Debris/Sediment/Rock, Deformation	**Physical Barrier Severity:** Severe	**Physical Barrier Location:** Outlet and inlet. Inside pipe unknown
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Local Outlet Scour, Embankment Slope Instability, Poor Channel Alignment, No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

Road Photos







Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo





Crossing Outlet Photo



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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 9, 2024 10:33 AM

Culvert ID: Gilbert-1	**Road name:** Gilbert rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 27′ 0″	**Structure Length:** 54′ 6″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	One Side		Poor

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Dam upstream appears to be manmade

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 6″ **Inlet Height:** 1′ 6″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 6′ 6″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 6″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 6′ 6″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 6″ **Outlet Height:** 1′ 8″
Crossing Dimensions			
Road Fill Height: 9′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 5″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Bottom completely gone for several feet. Big stones observed inside at culvert bottom			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: Yes	**Location:** Near Inlet	**Distance From Crossing:** 80′ 0″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

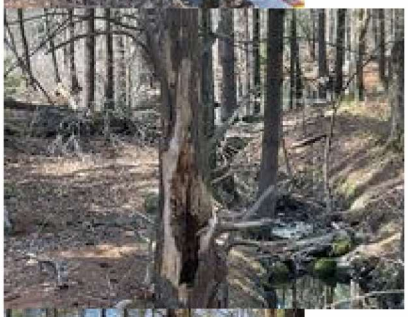
Road Photos

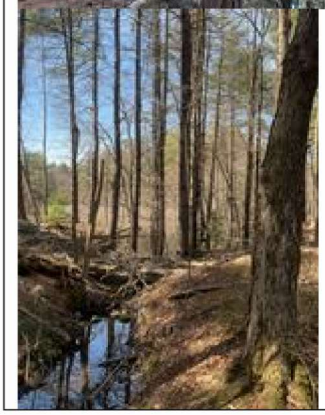




Upstream Photos







Downstream Embankment Photo





Crossing Inlet Photo



Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 16, 2024 6:09 AM

Culvert ID: Gilbert-2	**Road name:** Gilbert Rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23′ 6″	**Structure Length:** 50′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** Outlet deterioration hole and small scour area at outlet

Upstream Area

Approximate Bank full Width: 7′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Along road. seems to be a runoff channel.

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 0″ **Inlet Height:** 2′ 1″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream** **Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Poor***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Not aligned with channel

Downstream Area

Downstream Channel Bankfull Width: 6′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream:	

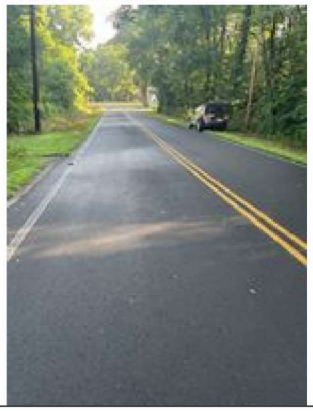
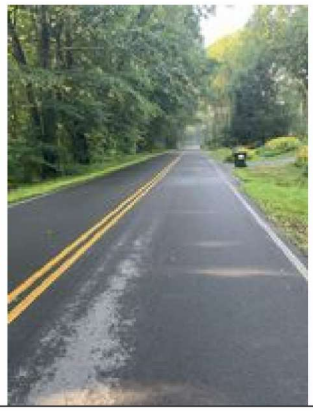
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Cascade	**Outlet Width:** 2′ 0″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 1′ 4″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 6″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Deterioration hole at outlet invert. Some larger than normal cobbles at outlet bottom. May be some infiltration of backfill. No flow so some dimensions could not be verified and were entered as zero.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: Dry	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? Unknown		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Local Outlet Scour, Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

Road Photos

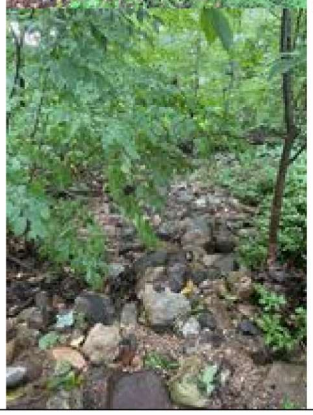
Upstream Photos



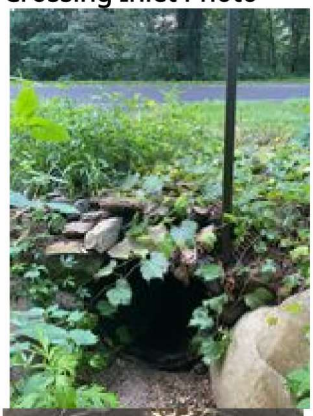


Downstream Embankment Photo

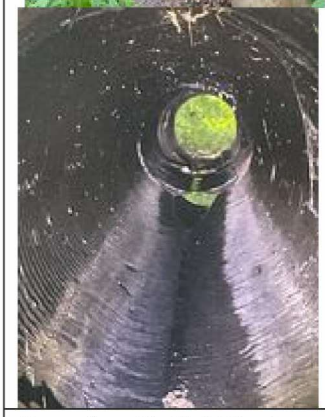




Crossing Inlet Photo

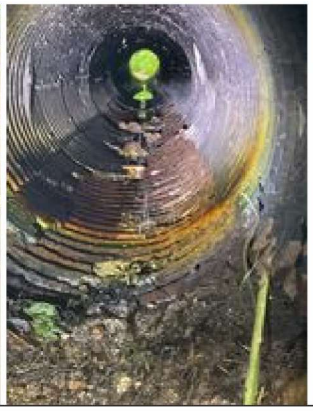






Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 16, 2024 7:05 AM

Culvert ID: Gilbert-3	**Road name:** Gilbert Rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 25′ 6″	**Structure Length:** 44′ 0″
Road Observations: Embankment erosion at inlet	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Inlet crushed and deformed with blockage from rupture of pipe

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** 30″ concrete pipe upstream just 12 feet from inlet. Bank full width unknown and therefore shown as zero

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 5″ **Inlet Height:** 1′ 10″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Critical **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 2′ 5″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Critical***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Poor***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Critical**	Apron: ***NA***
Cross-Section Deformation: ***Critical***	Embankment Piping: ***Adequate***

Inlet Observations: Crushed, deteriorated inlet with pieces of culvert obstructing passage

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream:	

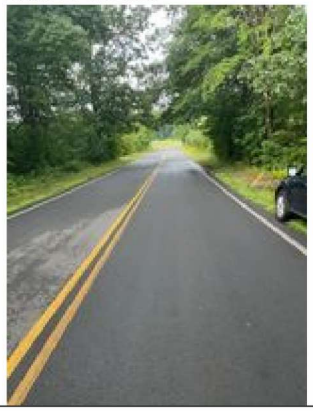
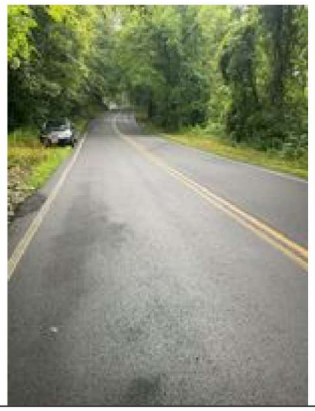
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 4″ **Outlet Height:** 2′ 3″
Crossing Dimensions			
Road Fill Height: 2′ 8″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2′ 4″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Barbed wire at outlet			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Deformation, Fencing	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

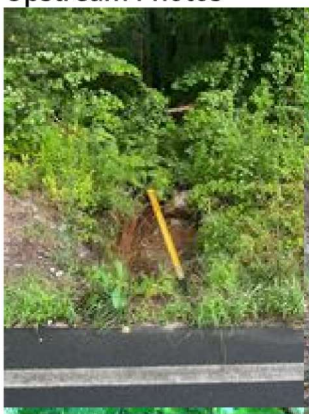
Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Aggressive Abrasion/Corrosion/Chemical, Buoyancy or Crushing-Related Inltet Failure	**Comments:**

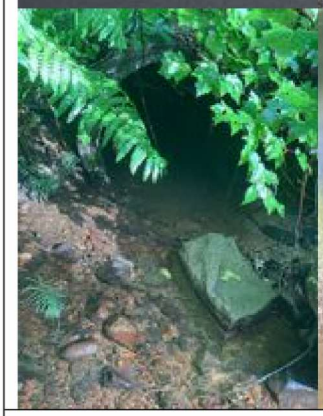
Photo Log

Road Photos


Upstream Photos






Downstream Embankment Photo




Crossing Inlet Photo






Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 16, 2024 8:00 AM

Culvert ID: Gilbert-4	**Road name:** Gilbert RD	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 25′ 0″	**Structure Length:** 46′ 0″
Road Observations: Small crack developing over culvert across roadway pavement	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Outlet submerged. Inlet flared end deteriorated

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Heavy vegetation unable to verify bank full width

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 4″ **Inlet Height:** 1′ 4″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 3″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Poor***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Could not see through full length of pipe. Outlet submerged

Downstream Area

Downstream Channel Bankfull Width: N/A **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Heavy vegetation into flood zone. Barbed wire at outlet	

Crossing Outlet - Cannot Locate - Heavy Brush, High water			
Structure Material:	**Outlet Shape:**	**Outlet Grade:**	**Outlet Width:** ' " **Outlet Height:** ' "
Crossing Dimensions			
Road Fill Height: ' "			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:**	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** ' " **Water Depth:** ' "		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ' " **Outlet Drop to Stream Bottom:** ' "	
Outlet Condition: Structural (Longitudinal) Alignment: Channel Alignment: Level of Blockage: Flared End Section: Invert Deterioration: Buoyancy or Crushing:		Cross-Section Deformation: Structural Integrity of Barrel: Joints and Seams: Footings: Headwall/Wingwalls: Apron: Embankment Piping:	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ' "
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Fencing	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

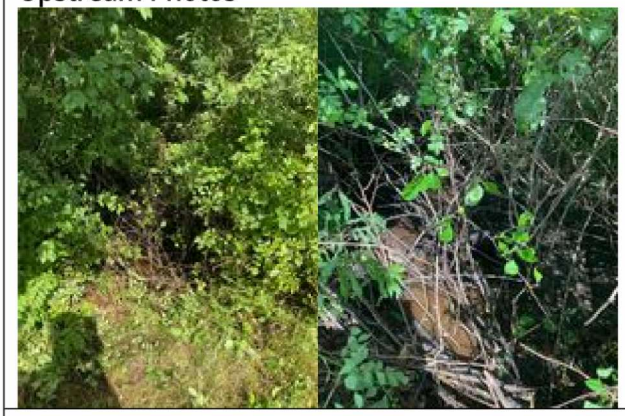
Field Recommendations: Maintenance **Performance Problems Requiring Action:** No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo

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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 10:28 AM

Culvert ID: Glendale-2	**Road name:** Glendale	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 25′ 0″	**Structure Length:** 55′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 18′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 4′ 0″ **Inlet Height:** 4′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″
Inlet Type: Headwall & Wingwalls **Headwall Material:** Concrete **Wingwall Material:** Concrete	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 2′ 6″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **NA**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 12′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Concrete	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 4′ 0″ **Outlet Height:** 4′ 0″
Crossing Dimensions			
Road Fill Height: 3′ 0″			
Headwall Material: Concrete **Wingwall Material:** Concrete		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2′ 4″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***NA***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



Upstream Photos





Downstream Embankment Photo



Crossing Inlet Photo









Crossing Outlet Photo







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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 8, 2024 1:04 PM

Culvert ID: High-1	**Road name:** High street	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 19′ 6″	**Structure Length:** 40′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Wet land

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 3″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 6″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 9′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall onto cascade	**Outlet Width:** 1′ 3″ **Outlet Height:** 1′ 3″
Crossing Dimensions			
Road Fill Height: 3′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0′ 7″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 6″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

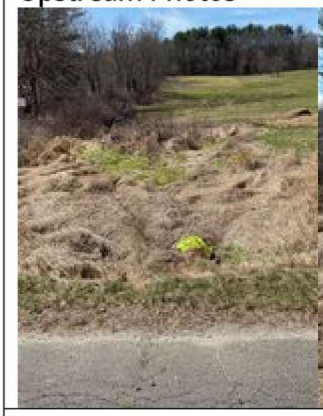
Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



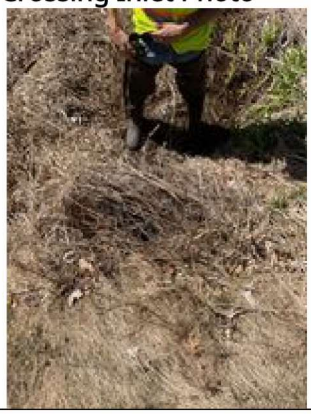

Upstream Photos




Downstream Embankment Photo




Crossing Inlet Photo





Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 8, 2024 12:22 PM

Culvert ID: High-2	**Road name:** High street	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Poor
Pavement Width: 18′ 0″	**Structure Length:** 38′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	One Side		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 8′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 6″ **Inlet Height:** 2′ 6″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 1″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream: Wetlands

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall onto cascade	**Outlet Width:** 2′ 5″ **Outlet Height:** 3′ 8″
Crossing Dimensions			
Road Fill Height: 3′ 10″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 9″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 1′ 1″ **Outlet Drop to Stream Bottom:** 1′ 2″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Poor***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

Road Photos






Upstream Photos





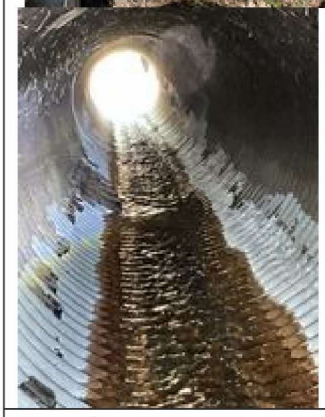
Downstream Embankment Photo




Crossing Inlet Photo







Crossing Outlet Photo






Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 8, 2024 12:42 PM

Culvert ID: High-3	**Road name:** High street	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Poor
Pavement Width: 20′ 0″	**Structure Length:** 48′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Stream comes from another pipe

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 6″ **Inlet Height:** 1′ 6″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 4′ 4″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 11″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 11′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

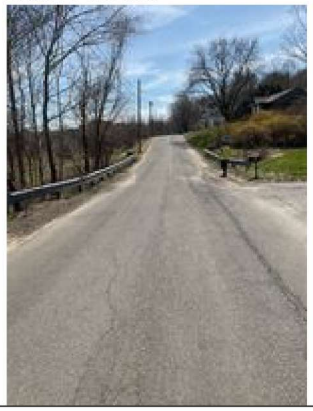
Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall onto cascade	**Outlet Width:** 1′ 6″ **Outlet Height:** 1′ 6″
Crossing Dimensions			
Road Fill Height: 5′ 6″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 9″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 1′ 1″ **Outlet Drop to Stream Bottom:** 1′ 1″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

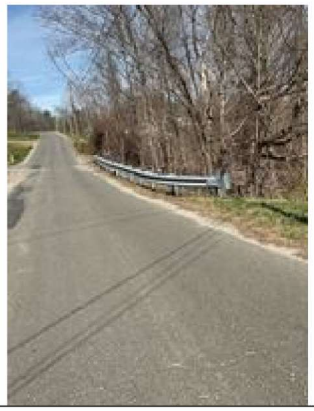
Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

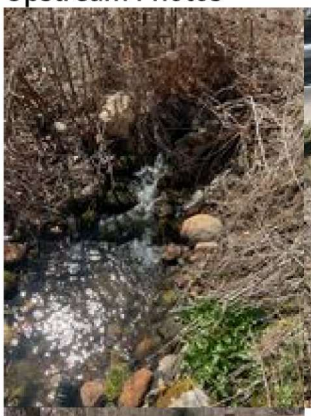
Photo Log

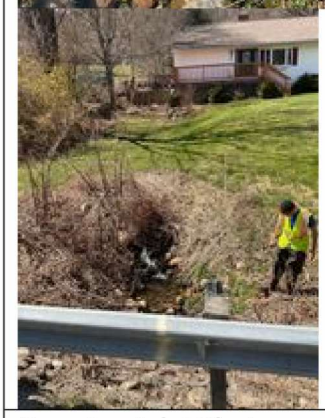
Road Photos



Upstream Photos





Downstream Embankment Photo




Crossing Inlet Photo






Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 3:16 PM

Culvert ID: High-4	**Road name:** High st	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 22′ 0″	**Structure Length:** 38′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** New
Flow Condition: Typical-Low	**Crossing Comments:** Inlet is open catch basin that allows streamflow

Upstream Area

Approximate Bank full Width: 10′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 0′ 0″ **Inlet Height:** 0′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 0′ 0″	
Inlet Type: Projecting **Headwall Material:** Stone Masonry catch basin **Wingwall Material:** Concrete	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Unknown***
Channel Alignment: ***Adequate***
Level of Blockage: ***Critical***
Flared End Section: ***NA***
Invert Deterioration: ***Adequate***
Buoyancy or Crushing: **Unknown**
Cross-Section Deformation: ***Unknown***
Structural Integrity of Barrel: ***Unknown***
Joints and Seams: ***Unknown***
Footings: ***NA***
Headwall/Wingwalls: ***Adequate***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Unknown***

Inlet Observations: Unable to access inlet pipe since Catchbasin prevents access

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate
Tailwater Scour Pool: None	
Notes on Downstream:	

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1′ 10″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 2′ 6″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 11″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 1′ 1″ **Outlet Drop to Stream Bottom:** 2′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



Upstream Photos







Downstream Embankment Photo





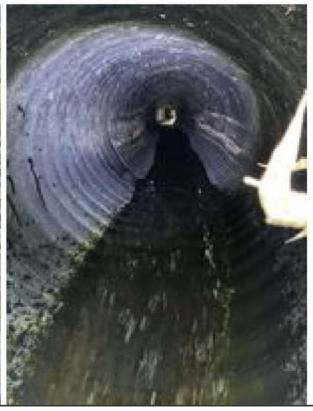
Crossing Inlet Photo







Crossing Outlet Photo

Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 2:52 PM

Culvert ID: High-5	**Road name:** High st	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 20′ 6″	**Structure Length:** 41′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** New
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 5′ 6″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 3′ 0″ **Inlet Height:** 3′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 2′ 1″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 5′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Large
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 3′ 0″ **Outlet Height:** 3′ 0″
Crossing Dimensions			
Road Fill Height: 0′ 7″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 2′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Outlet drop to stream bottom could not be measured due to fencing limiting access			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos

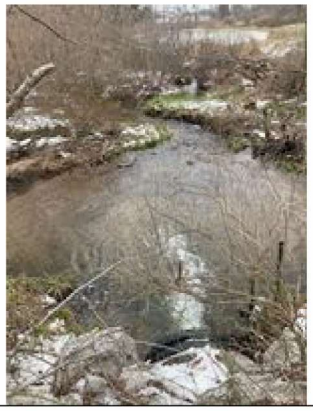


Upstream Photos





Downstream Embankment Photo



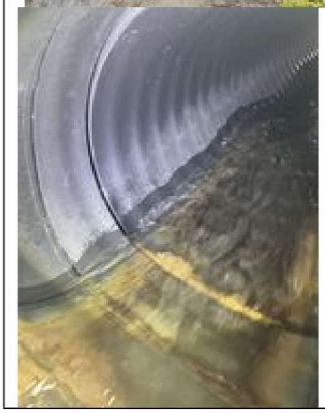
Crossing Inlet Photo











Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 18, 2024 9:40 AM

Culvert ID: LeadMine-1	**Road name:** Leadmine Road	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23′ 6″	**Structure Length:** 39′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 5′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 6″ **Inlet Height:** 1′ 6″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***
Channel Alignment: ***Critical***
Level of Blockage: ***Adequate***
Flared End Section: ***NA***
Invert Deterioration: ***Adequate***
Buoyancy or Crushing: **Adequate**
Cross-Section Deformation: ***Adequate***
Structural Integrity of Barrel: ***Adequate***
Joints and Seams: ***NA***
Footings: ***NA***
Headwall/Wingwalls: ***NA***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 5′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Small
Notes on Downstream:

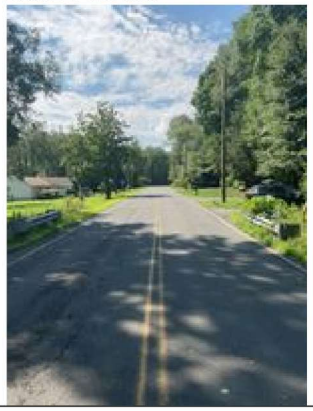
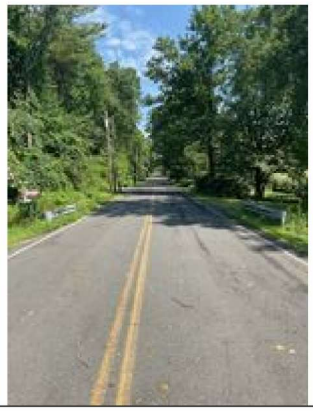
Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 6″ **Outlet Height:** 1′ 6″
Crossing Dimensions			
Road Fill Height: 4′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 9″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:** Poor Channel Alignment	**Comments:**

Photo Log

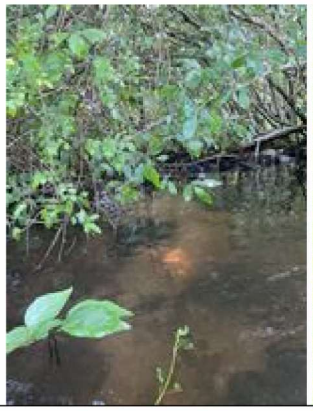
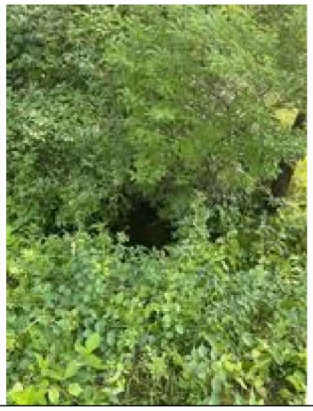
Road Photos

Upstream Photos




Downstream Embankment Photo

Crossing Inlet Photo





Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 18, 2024 10:07 AM

Culvert ID: LeadMine-2	**Road name:** Lead Mine Rd	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 25′ 0″	**Structure Length:** 41′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 5′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 0″ **Inlet Height:** 2′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Critical***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 5′ 6″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream:

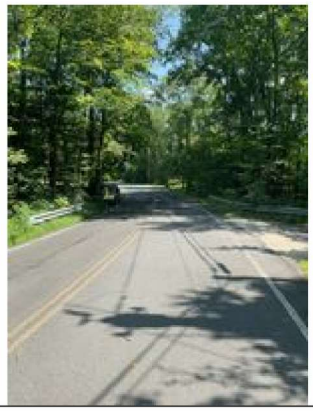
Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 0″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 3′ 6″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 9″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

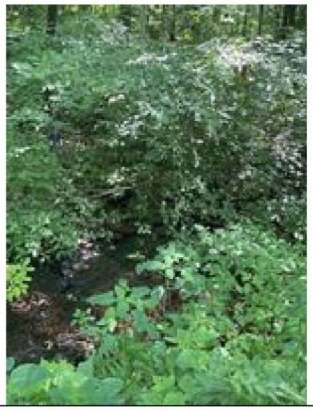
Road Photos

Upstream Photos



Downstream Embankment Photo

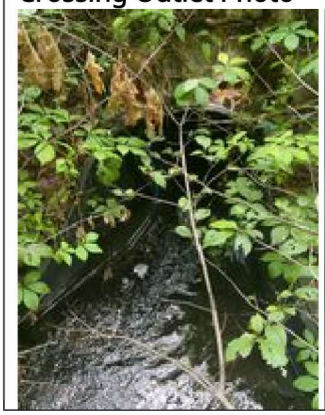


Crossing Inlet Photo





Crossing Outlet Photo




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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 1:05 PM

Culvert ID: LeadMine-3	**Road name:** Lead mine rd	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 26′ 0″	**Structure Length:** 48′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	One Side		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 20′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 2″ **Inlet Height:** 1′ 2″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 4′ 4″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 18′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 2″ **Outlet Height:** 1′ 2″
Crossing Dimensions			
Road Fill Height: 3′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos

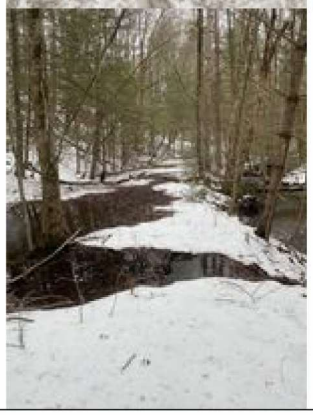



Upstream Photos



Downstream Embankment Photo





Crossing Inlet Photo






Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 12:44 PM

Culvert ID: LeadMine-4	**Road name:** Lead mine rd	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 24′ 0″	**Structure Length:** 38′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 14′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 4 - Box Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 6′ 0″ **Inlet Height:** 4′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″
Inlet Type: Headwall & Wingwalls, Mitered to Slope **Headwall Material:** Concrete **Wingwall Material:** Stone	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 5′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***NA***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***NA***	Armoring: ***NA***
Buoyancy or Crushing: **NA**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 18′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream:	

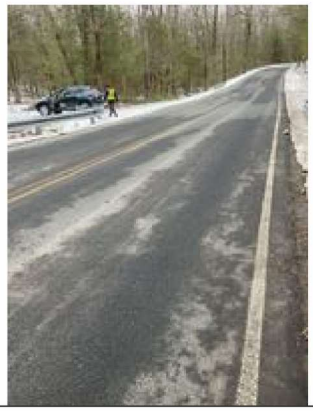
Crossing Outlet - Located -			
Structure Material: Concrete	**Outlet Shape:** 4 - Box Culvert	**Outlet Grade:** Cascade	**Outlet Width:** 6′ 0″ **Outlet Height:** 4′ 0″
Crossing Dimensions			
Road Fill Height: 3′ 6″			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 5′ 0″ **Water Depth:** 5′ 5″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 1′ 10″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***NA*** Buoyancy or Crushing: ***NA***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***NA*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Cascade after outlet culvert box bottom			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos

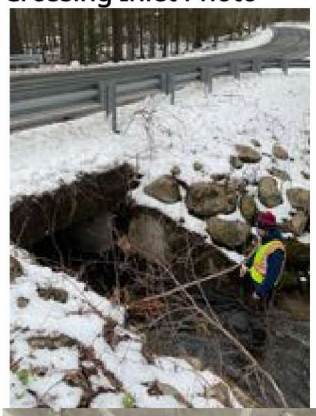
Upstream Photos

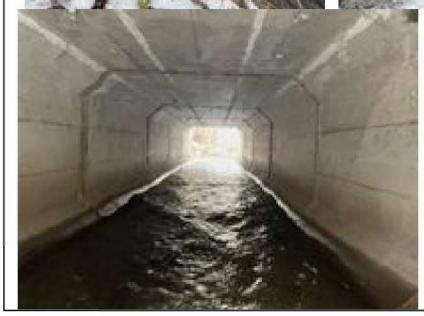


Downstream Embankment Photo

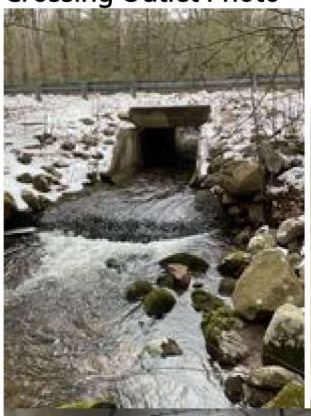


Crossing Inlet Photo



Crossing Outlet Photo









Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 1:16 PM

Culvert ID: Line-1	**Road name:** Line street	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 37′ 0″	**Structure Length:** 69′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☑ Yes ☐ No	One Side	Asphalt	Poor
Curbing	☑ Yes ☐ No	Both Sides	Asphalt Berm	Poor
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Multiple Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 9′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 2 **Observations:**
Distance Between Culvert Barrels: 3′ 3″	

Crossing Inlet - Barrel 1- Located -

Inlet Shape: 2 - Pipe Arch/Elliptical Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 4′ 4″ **Inlet Height:** 3′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 3′ 4″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***
Channel Alignment: ***Adequate***
Level of Blockage: ***Adequate***
Flared End Section: ***Adequate***
Invert Deterioration: ***Adequate***
Buoyancy or Crushing: **Adequate**
Cross-Section Deformation: ***Adequate***
Structural Integrity of Barrel: ***Adequate***
Joints and Seams: ***Adequate***
Footings: ***NA***
Headwall/Wingwalls: ***NA***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Adequate***

Inlet Observations: Some denting of the top

Crossing Inlet - Barrel 2- Located -

Inlet Shape: 2 - Pipe Arch/Elliptical Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 4′ 4″ **Inlet Height:** 3′ 2″

Crossing Dimensions		
Bend Mid-Crossing: None	**Road Fill Height:** 1’ 1”	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1’ 10” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Same as other

Downstream Area	
Downstream Channel Bankfull Width: 14’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 2 **Constriction:** Severe
Tailwater Scour Pool: None	
Distance Between Culvert Barrels: 2’ 0”	
Notes on Downstream:	

Crossing Outlet - Barrel 1 - Located -			
Structure Material: Metal	**Outlet Shape:** 2 - Pipe Arch/Elliptical Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 4’ 6” **Outlet Height:** 3’ 2”

Crossing Dimensions	
Road Fill Height: 3’ 0”	
Headwall Material: None **Wingwall Material:** None	**Embankment Condition:** Adequate
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 4’ 0” **Water Depth:** 0’ 0”	**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”

Outlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Cross-Section Deformation: ***Adequate***
Channel Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Level of Blockage: ***Adequate***	Joints and Seams: ***Adequate***
Flared End Section: ***Adequate***	Footings: ***NA***
Invert Deterioration: ***Adequate***	Headwall/Wingwalls: ***NA***
Buoyancy or Crushing: ***Adequate***	Apron: ***NA***
	Embankment Piping: ***Adequate***

Crossing Outlet Observations:

Crossing Outlet - Barrel 2 - Located -

Structure Material: Metal	**Outlet Shape:** 2 - Pipe Arch/Elliptical Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 4′ 6″ **Outlet Height:** 2′ 11″
Crossing Dimensions			
Road Fill Height: 3′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 4′ 4″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing:	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise	**Comments:**

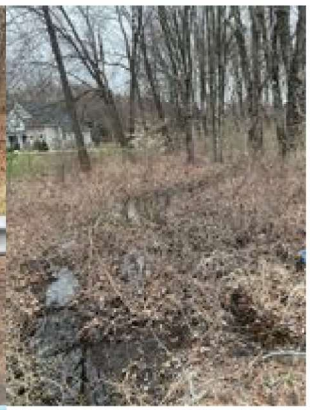
Photo Log

Road Photos





Upstream Photos


Downstream Embankment Photo






Crossing Inlet Photo



Crossing Outlet Photo



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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 9, 2024 3:18 PM

Culvert ID: Maple-2	**Road name:** Maple st	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 22′ 0″	**Structure Length:** 41′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 3″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 4′ 4″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 10″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Critical***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 9′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Small
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 3″ **Outlet Height:** 1′ 1″
Crossing Dimensions			
Road Fill Height: 4′ 2″			
Headwall Material: Stone **Wingwall Material:** Stone		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 9″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: Flared End Section: ***Critical*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

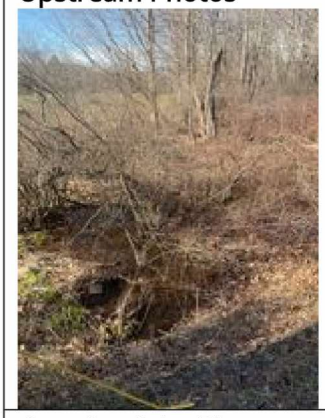
Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Local Outlet Scour, Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo







Crossing Outlet Photo









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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 9, 2024 2:50 PM

Culvert ID: Maple-3	**Road name:** Maple st	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 24′ 0″	**Structure Length:** 44′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 12′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 3″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″	
Inlet Type: Projecting, Other **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 9″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Small
Notes on Downstream: Wetland area and private property. Bankfull could not be measured

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 1″ **Outlet Height:** 0′ 10″
Crossing Dimensions			
Road Fill Height: 2′ 8″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 1″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Adequate*** Level of Blockage: ***Poor*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***		Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Crossing Outlet Observations: Much could not be verified due to high water elevation in pipe.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** 50%	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** Sediment Blockage > 1/2 the opening	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo

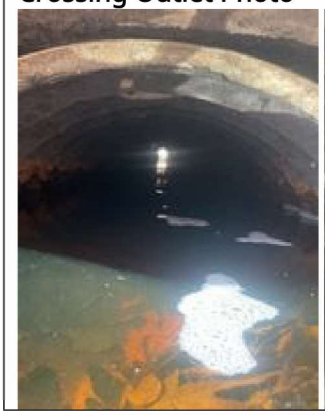


Crossing Inlet Photo





Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 9, 2024 2:25 PM

Culvert ID: Maple-4	**Road name:** Maple st	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 30′ 0″	**Structure Length:** 63′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Unknown
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 18′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 4″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: Skewed (<45)	**Road Fill Height:** 2′ 2″
Inlet Type: None **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 4″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Unknown***
Channel Alignment: ***Adequate***
Level of Blockage: ***Adequate***
Flared End Section: ***Critical***
Invert Deterioration: ***Critical***
Buoyancy or Crushing: **Critical**
Cross-Section Deformation: ***Unknown***
Structural Integrity of Barrel: ***Unknown***
Joints and Seams: ***Unknown***
Footings: ***NA***
Headwall/Wingwalls: ***NA***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Unknown***

Inlet Observations: Much was unknown lack of visibility

Downstream Area

Downstream Channel Bankfull Width: 6′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 6″ **Outlet Height:** 1′ 6″
Crossing Dimensions			
Road Fill Height: 2′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 3″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

Road Photos




Upstream Photos



Downstream Embankment Photo

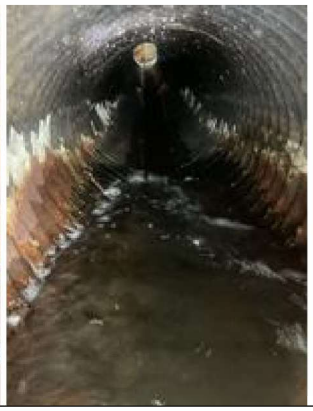


Crossing Inlet Photo




Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 3:40 PM

Culvert ID: Maple-5	**Road name:** High st	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 20′ 0″	**Structure Length:** 40′ 0″
Road Observations: There is a crack along the length of the culvert in the pavement.	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: No Flow	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 6′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Spans full channel & banks	**Number of Barrels:** 1 **Observations:** Water is from roadway runoff or similar drainage from multiple sources

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 4″ **Inlet Height:** 2′ 4″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** Adequate	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 8″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***Adequate***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 11′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 4″ **Outlet Height:** 2′ 4″
Crossing Dimensions			
Road Fill Height: 1′ 6″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 4″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos




Upstream Photos




Downstream Embankment Photo




Crossing Inlet Photo





Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 18, 2024 12:21 PM

Culvert ID: Middle-1	**Road name:** Middle Rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 6″	**Structure Length:** 80′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 4′ 6″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 6″ **Inlet Height:** 1′ 5″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 13′ 13″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 7″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Poor***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Poor***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 3′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream:

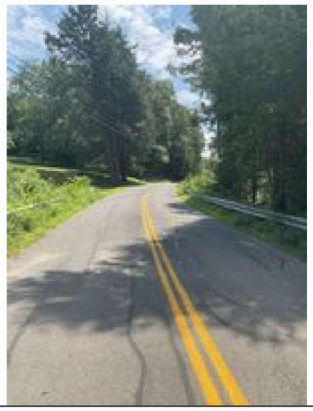
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall onto cascade	**Outlet Width:** 1′ 6″ **Outlet Height:** 1′ 6″
Crossing Dimensions			
Road Fill Height: 18′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 7″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 2′ 2″ **Outlet Drop to Stream Bottom:** 15′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Poor*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

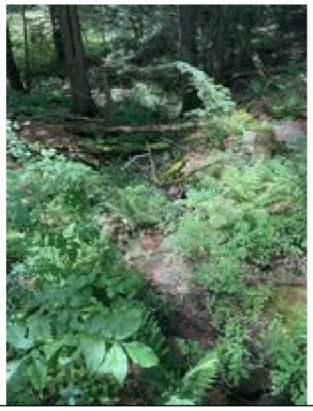
Road Photos




Upstream Photos

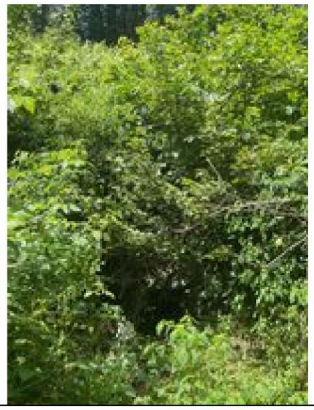


Downstream Embankment Photo

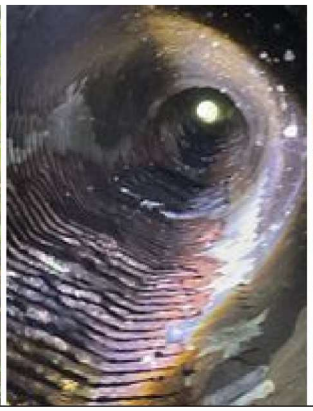



Crossing Inlet Photo



Crossing Outlet Photo



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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 22, 2024 7:40 AM

Culvert ID: Middle-10	**Road name:** Middle rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23′ 0″	**Structure Length:** 37′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 3′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** 8″ drain upstream

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 6″ **Inlet Height:** 1′ 4″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Headwall **Headwall Material:** Concrete **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 5″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 4′ 6″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: Small
Notes on Downstream: 18" concrete pipe culvert follows stream under driveway

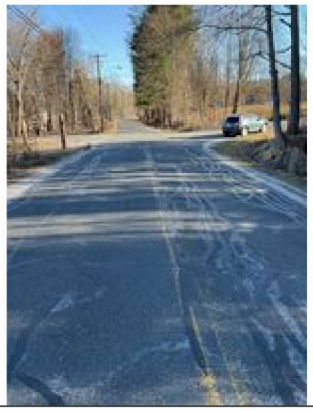
Crossing Outlet - Located -			
Structure Material: Concrete	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1' 6" **Outlet Height:** 1' 6"
Crossing Dimensions			
Road Fill Height: 1' 3"			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: **Substrate/Water Width:** 0' 5" **Water Depth:** 0' 0"		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 2' 2" **Outlet Drop to Stream Bottom:** 2' 6"	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ' "
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

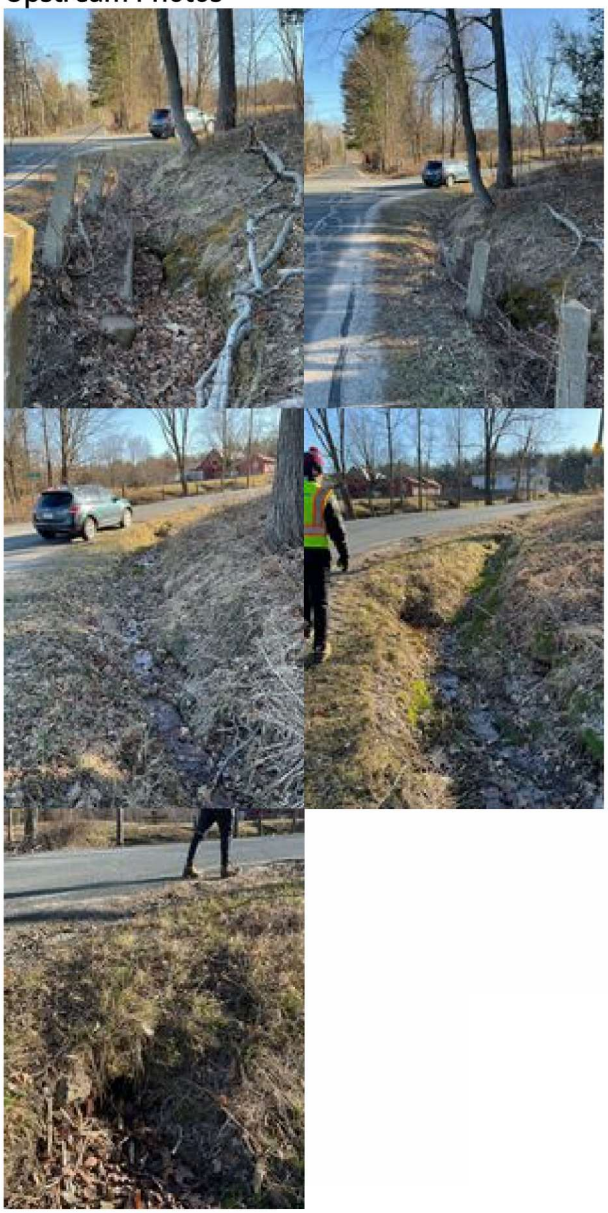
Photo Log

Road Photos





Upstream Photos



Downstream Embankment Photo



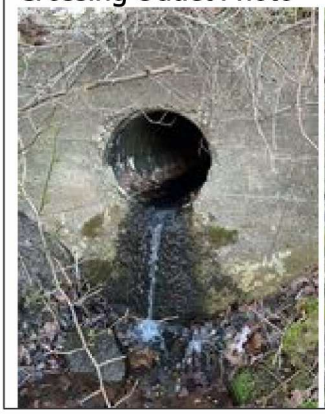
Crossing Inlet Photo







Crossing Outlet Photo






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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 18, 2024 1:37 PM

Culvert ID: Middle-11	**Road name:** Middle Rd	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Poor
Pavement Width: 30′ 0″	**Structure Length:** 58′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: No Flow	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 0″ **Inlet Height:** 1′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Inlet is a roadway runoff channel.

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream: Wetlands area. According to property owner, roadway runoff causes flooding.

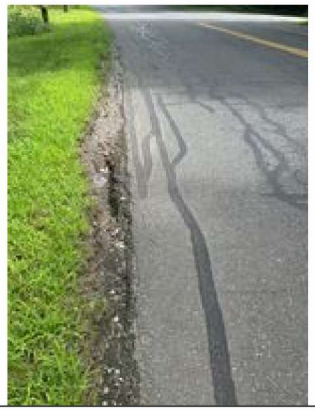
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 0′ 0″ **Outlet Height:** 0′ 0″
Crossing Dimensions			
Road Fill Height: 0′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Unknown*** Level of Blockage: ***Unknown*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***		Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Crossing Outlet Observations: Catch basin with multiple drain pipes.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? Yes		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos


Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo





Crossing Outlet Photo




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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 18, 2024 1:07 PM

Culvert ID: Middle-2	**Road name:** Middle Rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 22′ 0″	**Structure Length:** 110′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Severe deterioration at inlet and denting of outlet with minor deterioration. Headwall unstable at inlet.

Upstream Area

Approximate Bank full Width: 10′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 6″ **Inlet Height:** 2′ 6″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 6′ 6″
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 10″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Critical***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 4′ 6″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream:	

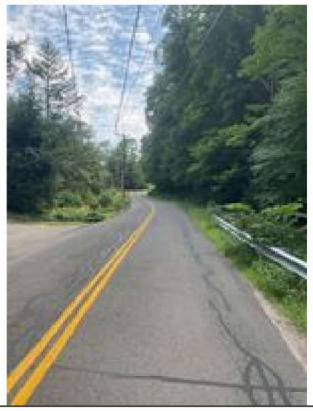
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 3′ 1″ **Outlet Height:** 2′ 11″
Crossing Dimensions			
Road Fill Height: 10′ 0″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 2″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 5″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***NA***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Some denting of top of metal pipe			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



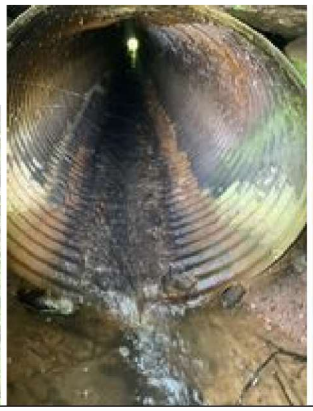


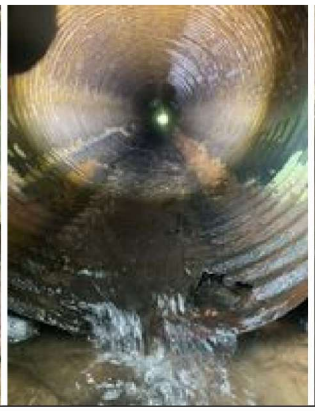


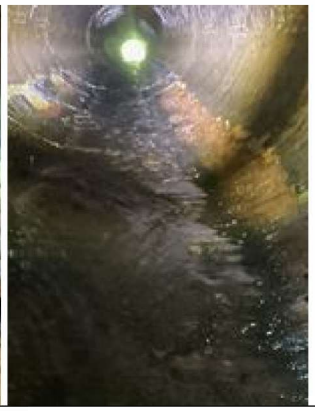


Crossing Outlet Photo









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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 22, 2024 1:55 PM

Culvert ID: Middle-3	**Road name:** Middle rd	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 25′ 0″	**Structure Length:** 40′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: No Flow	**Crossing Comments:** Sediment in pipe.

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Cannot Locate - Other

Inlet Shape:	**Inlet Grade:**	**Inlet Width:** ′ ″ **Inlet Height:** ′ ″

Crossing Dimensions

Bend Mid-Crossing:	**Road Fill Height:** ′ ″
Inlet Type: **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** **Armoring/Riprap Condition:**

Scour: **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** ′ ″ **Water Depth:** ′ ″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment:	Structural Integrity of Barrel:
Channel Alignment:	Joints and Seams:
Level of Blockage:	Footings:
Flared End Section:	Headwall/Wingwalls:
Invert Deterioration:	Armoring:
Buoyancy or Crushing:	Apron:
Cross-Section Deformation:	Embankment Piping:

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream: Wetlands and completely dry outlet which is elevated 3 to 4 feet from water surface

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Unknown	**Outlet Width:** 1′ 3″ **Outlet Height:** 0′ 10″
Crossing Dimensions			
Road Fill Height: 3′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***NA*** Level of Blockage: ***Poor*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***		Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Can see some light through barrel at inlet. But dark since the inlet is inside drain, catch basin, or similar.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 50%	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Maintenance **Performance Problems Requiring Action:**	**Comments:** Much debris and or soil by oulet

Photo Log

Road Photos





Upstream Photos

Downstream Embankment Photo







Crossing Inlet Photo

Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 22, 2024 10:29 AM

Culvert ID: Middle-6	**Road name:** Middle rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23′ 0″	**Structure Length:** 36′ 6″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetland areas

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 4″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″
Inlet Type: Headwall **Headwall Material:** Concrete **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Large	**Substrate/Water Width:** 1′ 2″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Critical***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron:
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

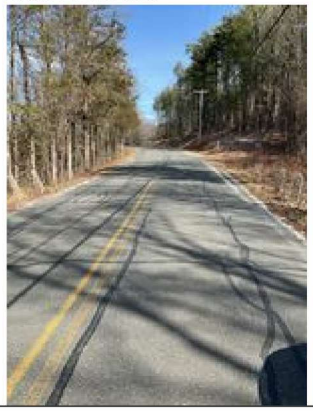
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Cascade	**Outlet Width:** 1′ 4″ **Outlet Height:** 1′ 6″
Crossing Dimensions			
Road Fill Height: 2′ 6″			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 2″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Critical*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

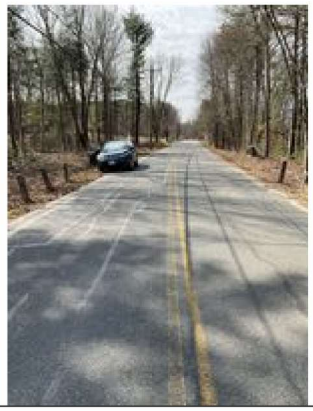
Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos





Upstream Photos







Downstream Embankment Photo





Crossing Inlet Photo







Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 22, 2024 9:47 AM

Culvert ID: Middle-7	**Road name:** Middle rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 22′ 0″	**Structure Length:** 33′ 6″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Wetlands. Undefined banks

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 3″ **Inlet Height:** 1′ 1″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Headwall **Headwall Material:** Concrete **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 3″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Relatively wide area of water as compared to inlet size

Downstream Area

Downstream Channel Bankfull Width: 5′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: Large
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1′ 4″ **Outlet Height:** 1′ 5″
Crossing Dimensions			
Road Fill Height: 1′ 1″			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 6″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 1′ 8″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

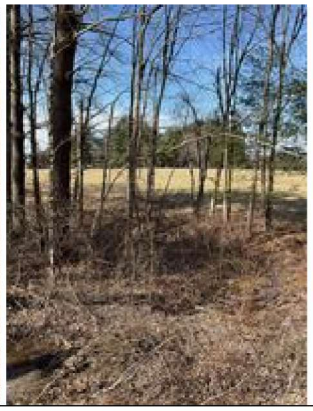
Photo Log

Road Photos

Upstream Photos




Downstream Embankment Photo

Crossing Inlet Photo





Crossing Outlet Photo







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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 22, 2024 9:01 AM

Culvert ID: Middle-8	**Road name:** Middle rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 0″	**Structure Length:** 40′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 18′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Inlet Drop	**Inlet Width:** 2′ 0″ **Inlet Height:** 2′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″
Inlet Type: Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 9″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Some blockage from logs at inlet

Downstream Area

Downstream Channel Bankfull Width: 7′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: Large
Notes on Downstream:

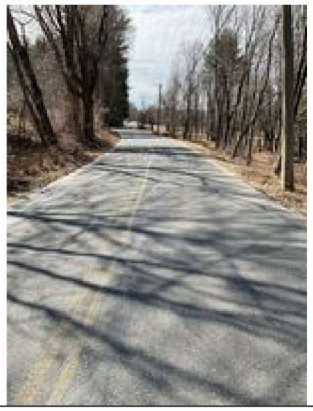
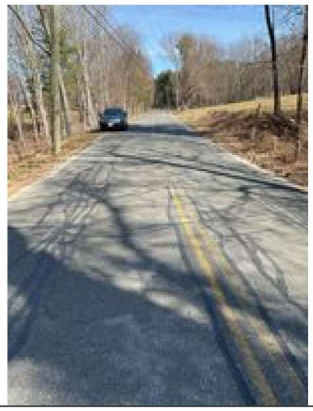
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall onto cascade	**Outlet Width:** 2′ 0″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 7′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 7″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 5′ 5″ **Outlet Drop to Stream Bottom:** 6′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Many dead trees over outlet. Access was difficult. Steep slope and fence over outlet			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: Fencing	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

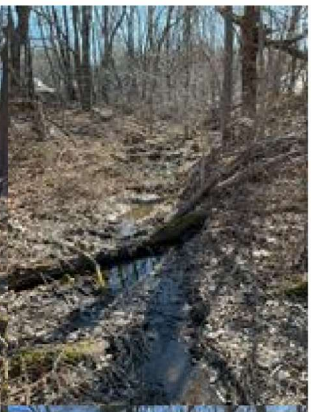
Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

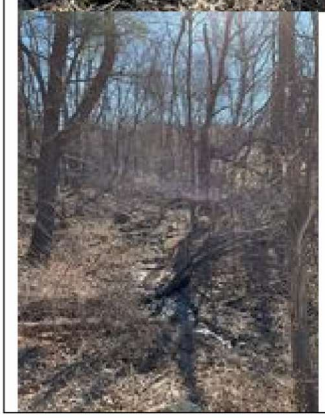
Photo Log

Road Photos

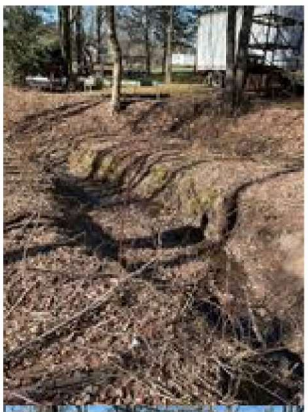



Upstream Photos

Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 22, 2024 8:26 AM

Culvert ID: Middle-9	**Road name:** Middle rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23′ 0″	**Structure Length:** 40′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 3′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** 20′ upstream private property fencing

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 1″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″
Inlet Type: Headwall **Headwall Material:** Stone, Concrete **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 1″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 3′ 6″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: Small
Notes on Downstream: Stream to pond

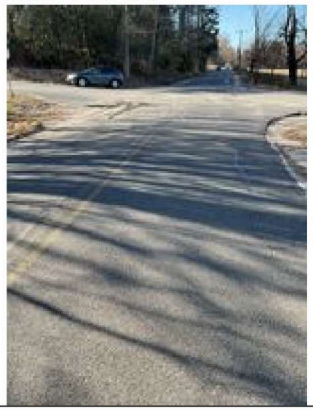
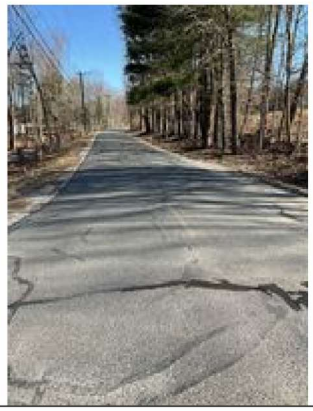
Crossing Outlet - Located -			
Structure Material: Concrete	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1′ 2″ **Outlet Height:** 1′ 2″
Crossing Dimensions			
Road Fill Height: 3′ 6″			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 6″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 6″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos

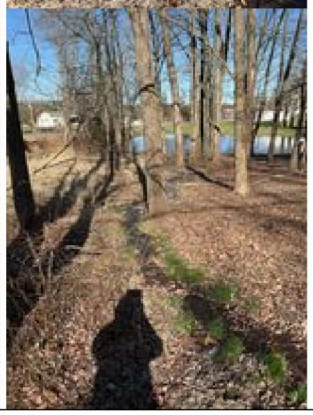
Upstream Photos






Downstream Embankment Photo



Crossing Inlet Photo







Crossing Outlet Photo






Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 18, 2024 10:33 AM

Culvert ID: Miller-1	**Road name:** Miller Ave	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Critical
Pavement Width: 25′ 0″	**Structure Length:** 43′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** Crossing was submerged at outlet at time of inspection, partially submerged at inlet.

Upstream Area

Approximate Bank full Width: 6′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 6″ **Inlet Height:** 1′ 4″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″	
Inlet Type: Projecting **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 6″ **Water Depth:** 1′ 1″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Critical***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Critical***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Blockage was removed.

Downstream Area

Downstream Channel Bankfull Width: 7′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Large	
Notes on Downstream:	

Crossing Outlet - Located **-**			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Clogged/collapsed/submerged	**Outlet Width:** 0′ 0″ **Outlet Height:** 0′ 0″

Crossing Dimensions	
Road Fill Height: 0′ 0″	
Headwall Material: None **Wingwall Material:** None	**Embankment Condition:** Adequate
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Unknown*** Level of Blockage: ***Unknown*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***	Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown***
Crossing Outlet Observations: Outlet is likely crushed and submerged.	

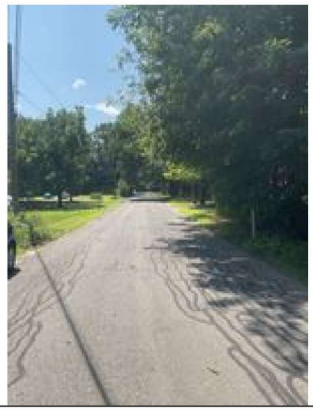
Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** No - Deeper **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Other	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Local Outlet Scour, Aggressive Abrasion/Corrosion/Chemical, No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

Road Photos

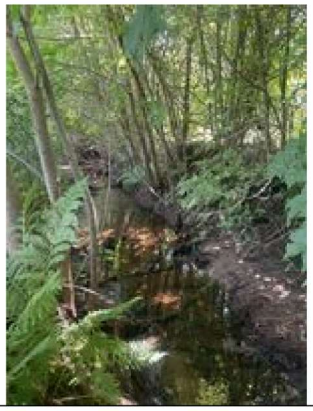




Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo







Crossing Outlet Photo



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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 26, 2024 6:44 AM

Culvert ID: Pequot-1	**Road name:** Pequot Rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 22′ 0″	**Structure Length:** 46′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 9′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 5″ **Inlet Height:** 1′ 2″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 4′ 4″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 5″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Critical***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Critical**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Bottom detached and uplifted by soil below. Tree roots along embankment

Downstream Area

Downstream Channel Bankfull Width: 4′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream:

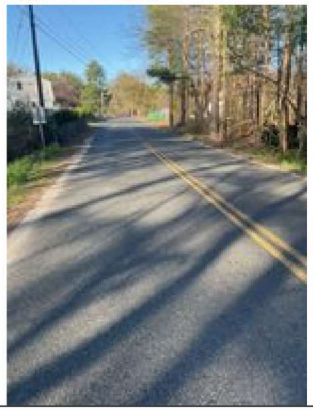
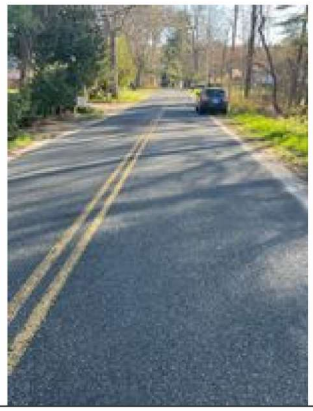
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 5″ **Outlet Height:** 1′ 6″
Crossing Dimensions			
Road Fill Height: 4′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 5″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

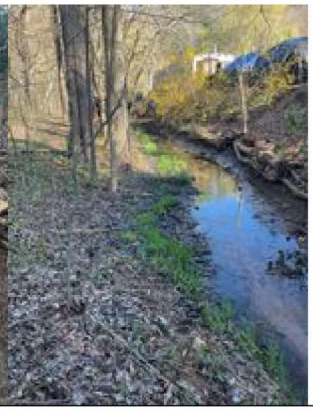
Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

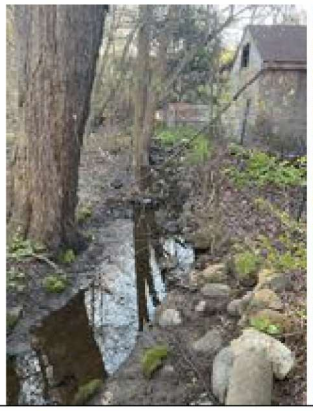
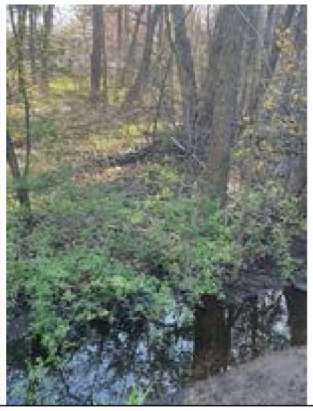
Road Photos

Upstream Photos

Downstream Embankment Photo

Crossing Inlet Photo





Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 18, 2024 2:11 PM

Culvert ID: Pequot-3	**Road name:** Pequot Rd.	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 22′ 0″	**Structure Length:** 40′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: No Flow	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 4′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 3″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 4′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

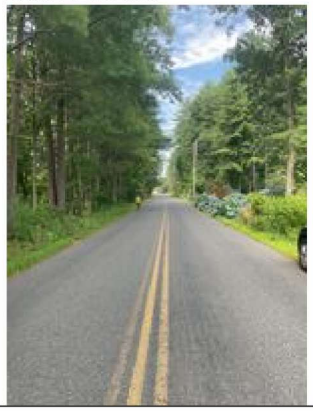
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 3″ **Outlet Height:** 0′ 7″
Crossing Dimensions			
Road Fill Height: 2′ 2″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Poor*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? Yes		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** Sediment Blockage > 1/2 the opening	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo







Crossing Outlet Photo









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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 26, 2024 9:50 AM

Culvert ID: Pleasant-1	**Road name:** Pleasant street	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 0″	**Structure Length:** 41′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 11′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Spans only bankfull/active channel	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 4 - Box Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 6′ 0″ **Inlet Height:** 4′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Headwall & Wingwalls, Mitered to Slope **Headwall Material:** Concrete **Wingwall Material:** Concrete	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 5′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***Adequate***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 11′ 6″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream:	

Crossing Outlet - Located -			
Structure Material: Concrete	**Outlet Shape:** 4 - Box Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 6′ 0″ **Outlet Height:** 4′ 0″
Crossing Dimensions			
Road Fill Height: 2′ 8″			
Headwall Material: Concrete **Wingwall Material:** Concrete		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 5′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***Adequate*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Faster
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

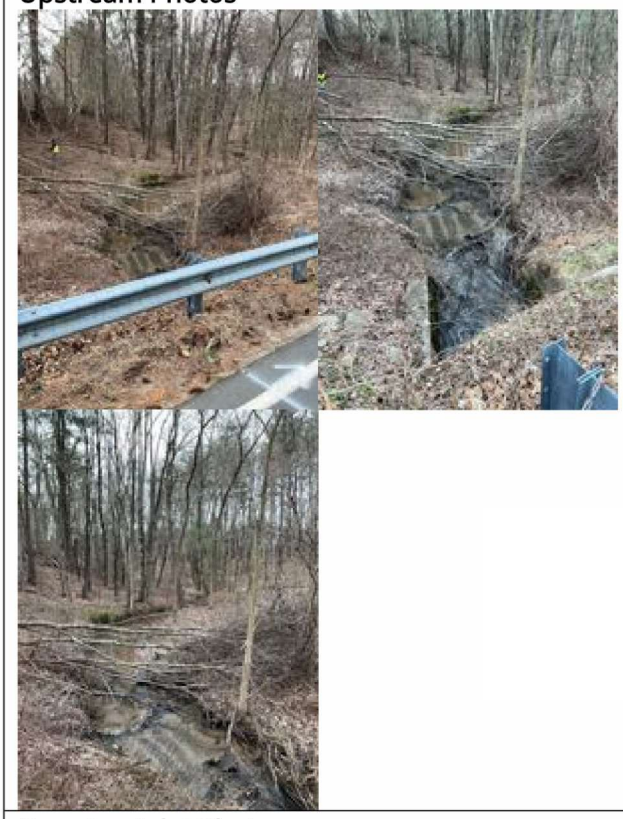
Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond — April 2, 2024 12:18 PM

Culvert ID: Pleasant-10	**Road name:** Pleasant road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23′ 0″	**Structure Length:** 59′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	One Side		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 2′ 6″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Inlet Drop	**Inlet Width:** 1′ 0″ **Inlet Height:** 1′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 0′ 6″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 8′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall onto cascade	**Outlet Width:** 1′ 0″ **Outlet Height:** 1′ 0″
Crossing Dimensions			
Road Fill Height: 6′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 4″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 8′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Rock has smashed a hole in top of barrel some feet in			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos





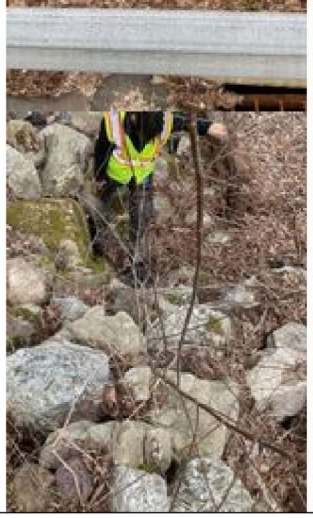
Upstream Photos





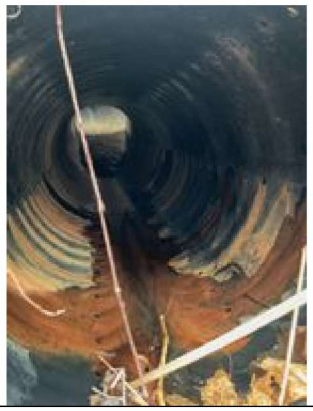
Downstream Embankment Photo






Crossing Inlet Photo





Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 12:42 PM

Culvert ID: Pleasant-11	**Road name:** Pleasant street	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23′ 0″	**Structure Length:** 80′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	One Side		Adequate

Crossing Alignment to Roadway: Skewed (>45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 12′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 0″ **Inlet Height:** 2′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** Adequate	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***Adequate***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 8′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Large
Notes on Downstream: Streams leads to private drive way culvert

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 2′ 0″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 6′ 0″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0′ 11″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 2′ 2″ **Outlet Drop to Stream Bottom:** 3′ 2″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

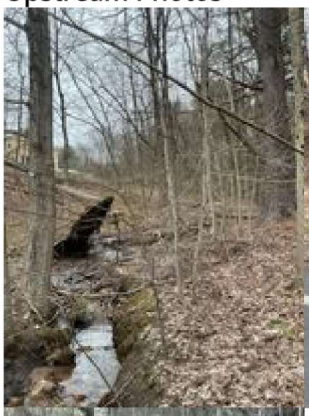
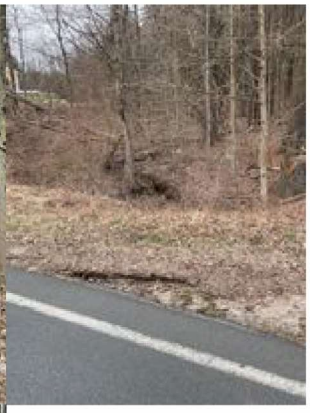
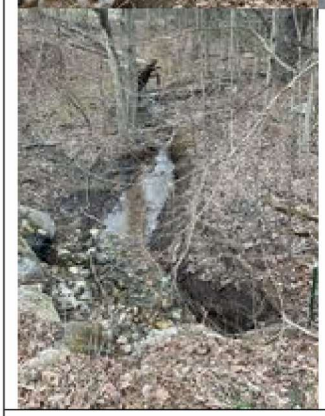
Photo Log

Road Photos



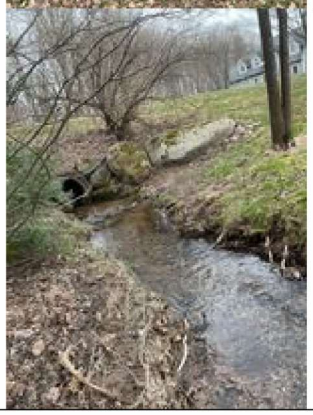


Upstream Photos

Downstream Embankment Photo





Crossing Inlet Photo






Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 26, 2024 10:26 AM

Culvert ID: Pleasant-2	**Road name:** Pleasant St.	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 3″	**Structure Length:** 49′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Wetlands

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 4″ **Inlet Height:** 1′ 4″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 6′ 6″	
Inlet Type: Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 10″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 12′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream: Small circular drainage pipe also leads into downstream. Very low flow, 1’ diameter. Inlet unknown

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall onto cascade	**Outlet Width:** 1’ 4” **Outlet Height:** 1’ 4”
Crossing Dimensions			
Road Fill Height: 10’ 0”			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0’ 10” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 3’ 3” **Outlet Drop to Stream Bottom:** 3’ 4”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Poor*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Poor*** Footings: ***Unknown*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Revetments above pipe			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Faster
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos






Upstream Photos





Downstream Embankment Photo







Crossing Inlet Photo



Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 26, 2024 12:29 PM

Culvert ID: Pleasant-3	**Road name:** Pleasant road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 3″	**Structure Length:** 37′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 20′ 0″ **Width Confidence:** **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Wetland area spans bank

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 0″ **Inlet Height:** 2′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting, Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** Adequate

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 10″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***Adequate***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 20′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream: Again wetlands

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 0″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 4′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 3″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 26, 2024 12:55 PM

Culvert ID: Pleasant-4	**Road name:** Pleasant road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 3″	**Structure Length:** 26′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Spans only bankfull/active channel	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 3″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** Adequate

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 10″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***Unknown***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***Adequate***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Spans only bankfull/active channel

Tailwater Scour Pool: None
Notes on Downstream:

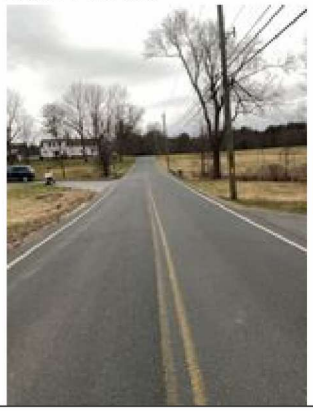
Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Cascade	**Outlet Width:** 1′ 3″ **Outlet Height:** 1′ 3″
Crossing Dimensions			
Road Fill Height: 3′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 8″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 5″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***Unknown*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** No - Faster
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

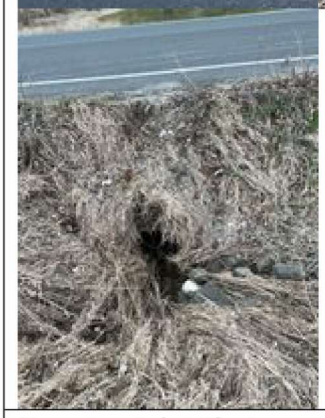
Road Photos






Upstream Photos





Downstream Embankment Photo






Crossing Inlet Photo




Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 26, 2024 1:14 PM

Culvert ID: Pleasant-5	**Road name:** Pleasant street	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 3″	**Structure Length:** 39′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 25′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 3″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 10″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 25′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 4″ **Outlet Height:** 1′ 4″
Crossing Dimensions			
Road Fill Height: 4′ 5″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 2″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



Upstream Photos



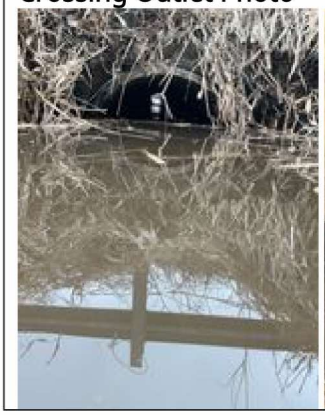
Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 26, 2024 1:40 PM

Culvert ID: Pleasant-6	**Road name:** Pleasant road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 3″	**Structure Length:** 49′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (>45)	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Small stream fed by wetlands, no real bank full width

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Inlet Drop	**Inlet Width:** 1′ 3″ **Inlet Height:** 1′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 10″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Poor***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Spans only bankfull/active channel

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 3″ **Outlet Height:** 1′ 3″
Crossing Dimensions			
Road Fill Height: 4′ 8″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 1″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***NA*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos





Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo






Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 10:06 AM

Culvert ID: Pleasant-7	**Road name:** Pleasant street	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 0″	**Structure Length:** 41′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Perched	**Inlet Width:** 1′ 0″ **Inlet Height:** 1′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 5′ 5″
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 0′ 9″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Unknown***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream: Wetlands into pond

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Clogged/collapsed/submerged	**Outlet Width:** 1′ 0″ **Outlet Height:** 0′ 6″
Crossing Dimensions			
Road Fill Height: 6′ 7″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***NA*** Level of Blockage: ***Unknown*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***		Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Crossing Outlet Observations: Completely submerged			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** 50%	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

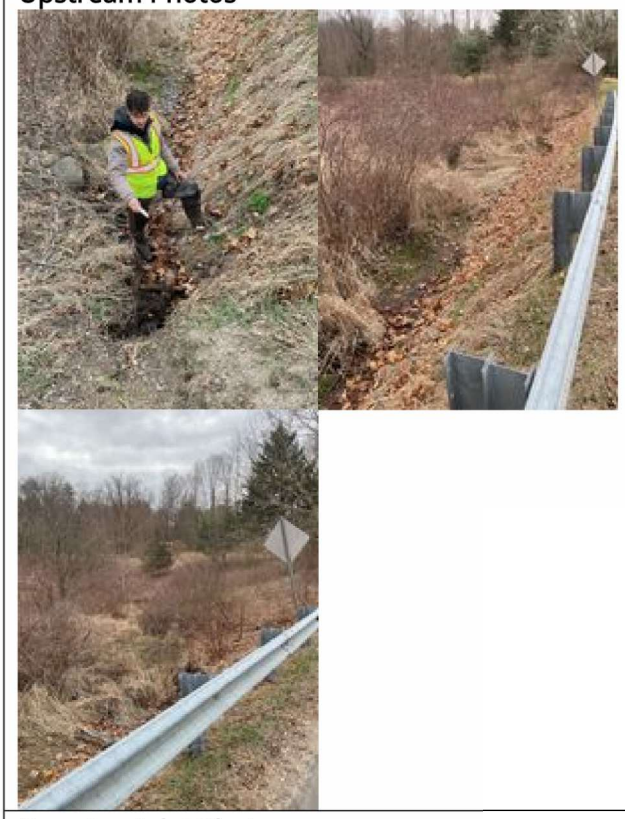
Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Sediment Blockage > 1/2 the opening, No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 26, 2024 2:01 PM

Culvert ID: Pleasant-8	**Road name:** Pleasant road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 0″	**Structure Length:** 39′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	One Side		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Spans only bankfull/active channel	**Number of Barrels:** 1 **Observations:** Dry pond area

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 1″ **Inlet Height:** 1′ 1″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 4′ 4″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 2″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Unknown***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Critical***	Embankment Piping: ***Adequate***

Inlet Observations: Appears to be a rock in the middle of the pipe or the pipe itself bending

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Spans only bankfull/active channel

Tailwater Scour Pool: None
Notes on Downstream: Wetland

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 1″ **Outlet Height:** 1′ 1″
Crossing Dimensions			
Road Fill Height: 5′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 2″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Unknown*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Same as inlet			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Debris/Sediment/Rock	**Physical Barrier Severity:** Minor	**Physical Barrier Location:** Center of pipe
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Sediment Blockage > 1/2 the opening, Embankment Slope Instability, Aggressive Abrasion/Corrosion/Chemical, Buoyancy or Crushing-Related Inltet Failure	**Comments:**

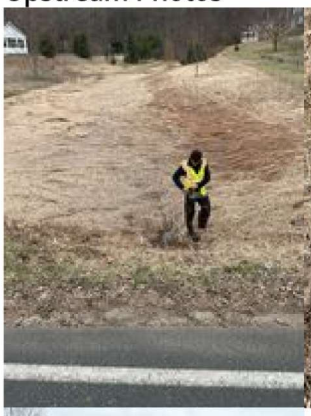
Photo Log

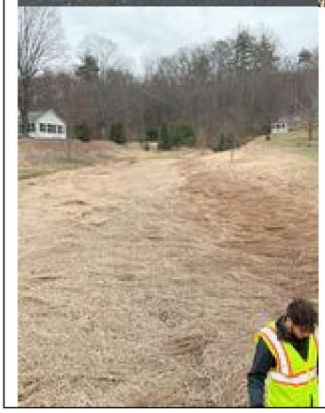
Road Photos





Upstream Photos





Downstream Embankment Photo






Crossing Inlet Photo



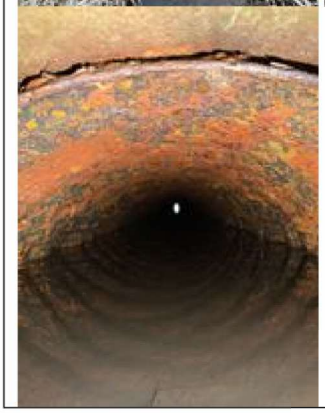




Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 10:34 AM

Culvert ID: Pleasant-9	**Road name:** Pleasant street	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23′ 0″	**Structure Length:** 53′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:** The inlet is a corrugated steel pipe with plastic flared end. The inlet pipe goes to a catch basin in the road. The catch basin has an outflow pipe that is plastic and continues through the outlet.

Upstream Area

Approximate Bank full Width: 6′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 4″ **Inlet Height:** 1′ 4″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting, Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 0′ 10″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area	
Downstream Channel Bankfull Width: 6′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate
Tailwater Scour Pool: Large	
Notes on Downstream:	

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1′ 3″ **Outlet Height:** 1′ 3″
Crossing Dimensions			
Road Fill Height: 4′ 10″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0′ 6″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 1′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos





Upstream Photos




Downstream Embankment Photo





Crossing Inlet Photo





Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 18, 2024 8:52 AM

Culvert ID: PomeroyMeadow-1	**Road name:** Pomeroy Moeadow Road	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 30′ 0″	**Structure Length:** 72′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☑ Yes ☐ No	One Side	Asphalt	Adequate
Curbing	☑ Yes ☐ No	Both Sides	Asphalt Berm	Adequate
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 5′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 8″ **Inlet Height:** 1′ 8″

Crossing Dimensions

Bend Mid-Crossing: Skewed (<45)	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting, Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** Adequate

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 8″ **Water Depth:** 0′ 0″	**Tree Present by Upstream** **Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Critical***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***Adequate***
Buoyancy or Crushing: **Adequate**	Apron: ***Adequate***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Inlet pipe outfalls to larger pipe.

Downstream Area

Downstream Channel Bankfull Width: 5′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream:	

Crossing Outlet - Located -			
Structure Material: Concrete	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 2′ 4″ **Outlet Height:** 2′ 4″
Crossing Dimensions			
Road Fill Height: 7′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 1′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***Adequate*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: Free Fall	**Physical Barrier Severity:** Severe	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos




Upstream Photos




Downstream Embankment Photo





Crossing Inlet Photo






Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 2:07 PM

Culvert ID: PomeroyMeadow-2	**Road name:** Pomeroy meadow rd	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 30′ 0″	**Structure Length:** 64′ 6″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 7′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape:	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 8″ **Inlet Height:** 1′ 4″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″
Inlet Type: Projecting, Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 4″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **NA**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 8′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Concrete	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 0″ **Outlet Height:** 1′ 10″
Crossing Dimensions			
Road Fill Height: 7′ 5″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***NA***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos




Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo





Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 26, 2024 11:11 AM

Culvert ID: PomeroyMeadow-4	**Road name:** Pomeroy rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 32′ 0″	**Structure Length:** 120′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☑ Yes ☐ No	Both Sides	Asphalt Berm	Adequate
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: No Flow	**Crossing Comments:** Dry

Upstream Area

Approximate Bank full Width: 6′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 0″ **Inlet Height:** 2′ 0″

Crossing Dimensions

Bend Mid-Crossing: Skewed (<45)	**Road Fill Height:** 0′ 0″
Inlet Type: Projecting, Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***Adequate***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Unknown***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 3′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Spans full channel & banks

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Concrete	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 6″ **Outlet Height:** 2′ 6″
Crossing Dimensions			
Road Fill Height: 4′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***Adequate*** Embankment Piping: ***Unknown***	
Crossing Outlet Observations: Bent mid crossing again. Drain visible also			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? Yes		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos





Upstream Photos



Downstream Embankment Photo



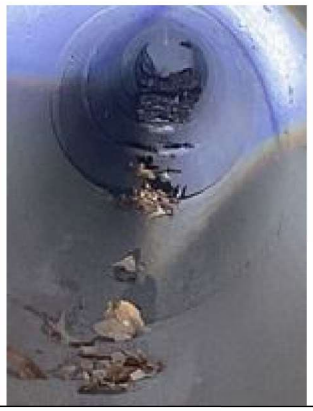




Crossing Inlet Photo







Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond August 29, 2024 7:09 AM

Culvert ID: Railroad-1	**Road name:** Rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Poor
Pavement Width: 0′ 0″	**Structure Length:** 30′ 0″
Road Observations: Abandoned railway with cross ties.	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** Outlet partially collapsed. Severe blockage from collapsed wingwall stones. Severe embankment erosion. Undermining of stone abutment walls throughout.

Upstream Area

Approximate Bank full Width: 5′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 6 - Box/Bridge with Abutments	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 4″ **Inlet Height:** 2′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 5′ 5″
Inlet Type: Headwall & Wingwalls **Headwall Material:** Stone **Wingwall Material:** Stone	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Inlet narrower than interior crossing. Undermining of stone abutment walls and eroded concrete/mortar.

Downstream Area	
Downstream Channel Bankfull Width: 10′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Steel mesh fencing 20 feet downstream. Steep embankment drop. Sink hole northeast approach by outlet.	

Crossing Outlet - Located -			
Structure Material: Rock/Stone	**Outlet Shape:** 6 - Box/Bridge with Abutments	**Outlet Grade:** Clogged/collapsed/submerged	**Outlet Width:** 2′ 3″ **Outlet Height:** 1′ 6″
Crossing Dimensions			
Road Fill Height: 6′ 0″			
Headwall Material: Stone **Wingwall Material:** Stone		**Embankment Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 4′ 6″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Critical*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Critical*** Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Critical*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Stone abutment wall near outlet undermined and collapsed. Collapsed stone wing walls and any embankment stability stones. Severe erosion and undermining of embankments. Channel erosion.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Cobble **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: Debris/Sediment/Rock, Deformation, Fencing, Dry	**Physical Barrier Severity:** Severe	**Physical Barrier Location:** Outlet
Dry Passage through Structure? Yes		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Local Outlet Scour, Channel	**Comments:**

Degradation/Headcut, Embankment Slope Instability, Aggressive Abrasion/Corrosion/Chemical	

Photo Log

Road Photos




Upstream Photos





Downstream Embankment Photo





Crossing Inlet Photo





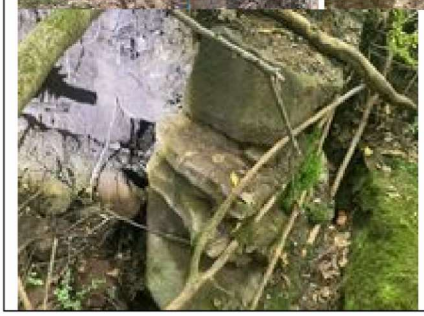

Crossing Outlet Photo











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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond August 29, 2024 3:19 PM

Culvert ID: Railroad-10	**Road name:** Rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Poor
Pavement Width: 0′ 0″	**Structure Length:** 70′ 0″
Road Observations: Overgrowth	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** Outlet failure, unstable and inlet scour. Embankment unstable.

Upstream Area

Approximate Bank full Width: 8′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Confluence upstream

Crossing Inlet - Located -

Inlet Shape: 6 - Box/Bridge with Abutments	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 11″ **Inlet Height:** 3′ 4″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 12′ 12″
Inlet Type: None **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***
Channel Alignment: ***Adequate***
Level of Blockage: ***Adequate***
Flared End Section: ***NA***
Invert Deterioration: ***Poor***
Buoyancy or Crushing: **Adequate**
Cross-Section Deformation: ***Adequate***
Structural Integrity of Barrel: ***Adequate***
Joints and Seams: ***Adequate***
Footings: ***NA***
Headwall/Wingwalls: ***NA***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Adequate***

Inlet Observations: Scour about 6″ deep.

Downstream Area

Downstream Channel Bankfull Width: 15′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream: Channel erosion.	

Crossing Outlet - Located -			
Structure Material: Rock/Stone	**Outlet Shape:** 6 - Box/Bridge with Abutments	**Outlet Grade:** Cascade	**Outlet Width:** 2′ 2″ **Outlet Height:** 3′ 4″
Crossing Dimensions			
Road Fill Height: 15′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 5′ 5″ **Outlet Drop to Stream Bottom:** 5′ 10″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Critical*** Channel Alignment: ***Critical*** Level of Blockage: ***Poor*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Critical***		Cross-Section Deformation: ***Critical*** Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***Critical*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Critical***	
Crossing Outlet Observations: Abutment wall collapsed 10′ from outlet. Outlet has severe undermining and a gap between the protruding 5′ of outlet structure and remaining crossing. Water passes along side and under outlet structure.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Contrasting	**Structure Substrate Type:** Cobble **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: Debris/Sediment/Rock, Deformation, Free Fall, Dry	**Physical Barrier Severity:** Severe	**Physical Barrier Location:** Outlet
Dry Passage through Structure? Yes		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Local Outlet Scour, Channel Degradation/Headcut, Embankment Slope Instability, Aggressive	**Comments:**

Abrasion/Corrosion/Chemical, Poor Channel Alignment, Embankment Piping	

Photo Log

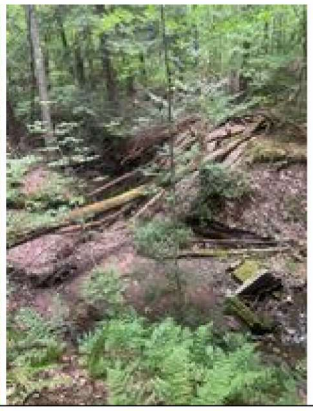
Road Photos




Upstream Photos




Downstream Embankment Photo

Crossing Inlet Photo





Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond August 29, 2024 2:49 PM

Culvert ID: Railroad-11	**Road name:** Rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Poor
Pavement Width: 0′ 0″	**Structure Length:** 45′ 0″
Road Observations: Overgrowth	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** Free fall to rock at outlet. Some scour at inlet. Stones at outlet collapsed but not stopping flow. Channel degradation typical.

Upstream Area

Approximate Bank full Width: 10′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Significant channel erosion. Stream meanders on approach to inlet.

Crossing Inlet - Located -

Inlet Shape: 6 - Box/Bridge with Abutments	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 2″ **Inlet Height:** 3′ 4″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting, Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Poor***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Debris blockage at inlet. Some scour.

Downstream Area

Downstream Channel Bankfull Width: 6′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream:	

Crossing Outlet - Located -			
Structure Material: Rock/Stone	**Outlet Shape:** 6 - Box/Bridge with Abutments	**Outlet Grade:** Free fall onto cascade	**Outlet Width:** 2′ 0″ **Outlet Height:** 1′ 4″
Crossing Dimensions			
Road Fill Height: 6′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 2′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***Poor*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Collapse, stones from outlet stone abutments and spanning stone on stream bottom downstream. Some of these got washed out. Some missing stones towards top of abutment at outlet left side looking upstream.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Contrasting	**Structure Substrate Type:** Cobble **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: Free Fall, Dry	**Physical Barrier Severity:** Minor	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Channel Degradation/Headcut	**Comments:** Stream bottom at the inlet is cobbles versus the outlet which is mostly soil before freefalling onto bedrock

Photo Log

Road Photos




Upstream Photos




Downstream Embankment Photo




Crossing Inlet Photo






Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond August 29, 2024 2:28 PM

Culvert ID: Railroad-12	**Road name:** Rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Poor
Pavement Width: 0′ 0″	**Structure Length:** 25′ 0″
Road Observations: railway with timber ties	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: No Flow	**Crossing Comments:** Some debris at inlet.

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Runoff channel

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Inlet Drop	**Inlet Width:** 1′ 6″ **Inlet Height:** 1′ 6″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 0′ 0″
Inlet Type: Headwall **Headwall Material:** Concrete **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Poor***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Debris blockage at inlet.

Downstream Area

Downstream Channel Bankfull Width: 7′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream: Fencing.

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1′ 6″ **Outlet Height:** 1′ 6″
Crossing Dimensions			
Road Fill Height: 1′ 6″			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 1′ 11″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: Fencing, Dry	**Physical Barrier Severity:** Minor	**Physical Barrier Location:** Outlet
Dry Passage through Structure? Yes		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise	**Comments:**

Photo Log

Road Photos




Upstream Photos




Downstream Embankment Photo




Crossing Inlet Photo





Crossing Outlet Photo




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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond August 29, 2024 1:45 PM

Culvert ID: Railroad-13	**Road name:** Rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 10′ 0″	**Structure Length:** 40′ 0″
Road Observations: Shared use bike path. Missing timber railing to ped. guardrail	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Critical

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Scour at inlet with undermining. Steel mesh fencing at outlet.

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetlands.

Crossing Inlet - Located -

Inlet Shape: 6 - Box/Bridge with Abutments	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 6″ **Inlet Height:** 2′ 11″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″
Inlet Type: Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Large	**Substrate/Water Width:** 2′ 6″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Inlet scour at bottom of stone walls as far as 4′ long and 6″ deep.

Downstream Area

Downstream Channel Bankfull Width: 4′ 6″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream:	

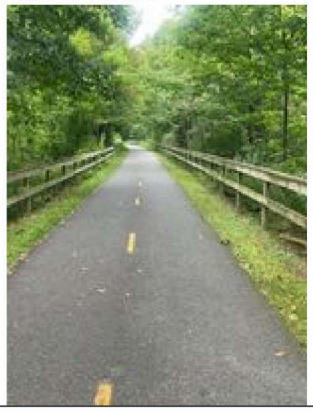
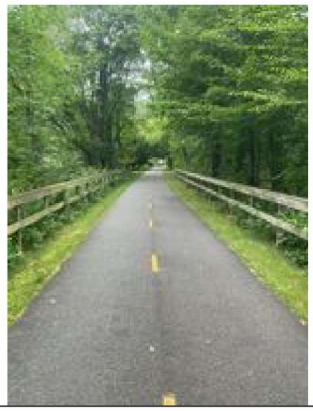
Crossing Outlet - Located **-**			
Structure Material: Rock/Stone	**Outlet Shape:** 6 - Box/Bridge with Abutments	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 8″ **Outlet Height:** 4′ 0″
Crossing Dimensions			
Road Fill Height: 4′ 0″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 2′ 8″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Steel mesh fencing at outlet. scour and undermining minor.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** No - Deeper **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Debris/Sediment/Rock, Fencing	**Physical Barrier Severity:** Minor	**Physical Barrier Location:** Outlet
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Local Outlet Scour	**Comments:**

Photo Log

Road Photos

Upstream Photos




Downstream Embankment Photo




Crossing Inlet Photo







Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond August 29, 2024 8:21 AM

Culvert ID: Railroad-2	**Road name:** Rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Critical
Pavement Width: 0′ 0″	**Structure Length:** 60′ 0″
Road Observations: Overgrowth into trail path.	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Concrete rehab at inlet and outlet about 6′ long. Scour at inlet and outlet about 3″ deep. Some scour within crossing at stone abutments. Near 90 degree channel alignment with crossing.

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetlands.

Crossing Inlet - Located -

Inlet Shape: 6 - Box/Bridge with Abutments	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 10″ **Inlet Height:** 2′ 8″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 12′ 12″
Inlet Type: Wingwalls **Headwall Material:** None **Wingwall Material:** Stone	**Embankment Condition:** Poor **Armoring/Riprap Condition:** Poor

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 4″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Critical***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Poor***	Armoring: ***Poor***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Concrete inlet along first 6 feet. Then stone abutments that have some scour within crossing. Scour at inlet corner. Stream approaches at perpendicular angle to crossing.

Downstream Area	
Downstream Channel Bankfull Width: 10′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream: Channel erosion severe.	

Crossing Outlet - Located -			
Structure Material: Rock/Stone	**Outlet Shape:** 6 - Box/Bridge with Abutments	**Outlet Grade:** Cascade	**Outlet Width:** 1′ 8″ **Outlet Height:** 3′ 4″

Crossing Dimensions	
Road Fill Height: 16′ 0″	
Headwall Material: None **Wingwall Material:** None	**Embankment Condition:** Poor
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 5″ **Water Depth:** 0′ 0″	**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 1′ 1″ **Outlet Drop to Stream Bottom:** 2′ 0″
Outlet Condition: Structural (Longitudinal) Alignment: ***Poor*** Channel Alignment: ***Critical*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***NA*** Buoyancy or Crushing: ***Adequate***	Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***
Crossing Outlet Observations: Cascade about 3′ tall within crossing. Undermining at concrete outlet 3″ deep.	

Operation and Maintenance Concerns	
Potential Illicit Discharged Observed: No	**Location:**
Notes on Illicit Discharge Evidence:	

Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** Cobble **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** Yes
Physical Barriers: Other	**Physical Barrier Severity:** Minor	**Physical Barrier Location:** Midlength
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Local Outlet Scour, Channel Degradation/Headcut, Poor Channel Alignment	**Comments:**

Photo Log

Road Photos




Upstream Photos





Downstream Embankment Photo





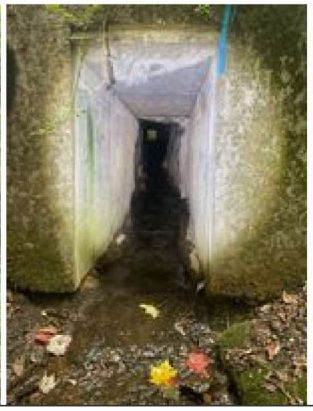
Crossing Inlet Photo







Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 29, 2024 8:46 AM

Culvert ID: Railroad-3	**Road name:** rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Adequate
Pavement Width: 0′ 0″	**Structure Length:** 125′ 0″
Road Observations: Old railway	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:** Open bottom stone 3 sided culvert. Stones span width and supported by stone walls

Upstream Area

Approximate Bank full Width: 10′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Erosion of many embankments and major meandoring of stream

Crossing Inlet - Located -

Inlet Shape: 6 - Box/Bridge with Abutments	**Inlet Grade:** At Stream Grade	**Inlet Width:** 3′ 6″ **Inlet Height:** 5′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 30′ 30″
Inlet Type: Headwall & Wingwalls **Headwall Material:** Stone **Wingwall Material:** Stone	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 3′ 6″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Critical***
Invert Deterioration: ***NA***	Armoring: ***NA***
Buoyancy or Crushing: **NA**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Poor***

Inlet Observations: Stones from head wall have fallen into stream. One other is close to falling. Wingwall unstable

Downstream Area

Downstream Channel Bankfull Width: 16′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream:	

Crossing Outlet - Located -			
Structure Material: Rock/Stone	**Outlet Shape:** 6 - Box/Bridge with Abutments	**Outlet Grade:** At stream grade	**Outlet Width:** 3′ 6″ **Outlet Height:** 4′ 10″
Crossing Dimensions			
Road Fill Height: 32′ 0″			
Headwall Material: Stone **Wingwall Material:** Stone		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 3′ 6″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***NA*** Buoyancy or Crushing: ***NA***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Embankment Piping	**Comments:**

Photo Log

Road Photos





Upstream Photos







Downstream Embankment Photo







Crossing Inlet Photo







Crossing Outlet Photo






Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond August 29, 2024 9:25 AM

Culvert ID: Railroad-4	**Road name:** Rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Poor
Pavement Width: 0′ 0″	**Structure Length:** 80′ 0″
Road Observations: Some crushed stone on path.	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Blocked inlet due to beaver dam. Deteriorated invert at outlet. Free fall to large scour pool.

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Pond.

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Inlet Drop	**Inlet Width:** 0′ 0″ **Inlet Height:** 0′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 18′ 18″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Critical **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Critical***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Beaver dam. Some surface rusting.

Downstream Area

Downstream Channel Bankfull Width: 10′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Large	
Notes on Downstream: Large scour pool. Debris. Aggredation beyond scour pool at outlet.	

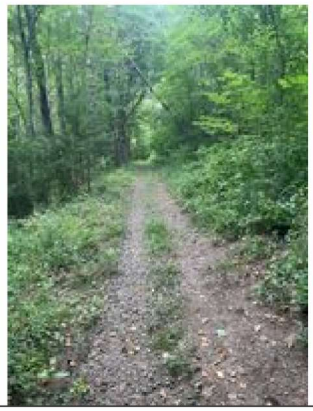
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 7′ 2″ **Outlet Height:** 7′ 4″
Crossing Dimensions			
Road Fill Height: 20′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2′ 4″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 2′ 2″ **Outlet Drop to Stream Bottom:** 4′ 10″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Free fall to large scour pool. Section loss from deterioration at invert.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: Yes	**Location:** Near Inlet	**Distance From Crossing:** 5′ 0″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** No - Faster
Physical Barriers: Debris/Sediment/Rock, Free Fall	**Physical Barrier Severity:** Severe	**Physical Barrier Location:** Outlet
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Local Outlet Scour, Channel Degradation/Headcut, Aggressive Abrasion/Corrosion/Chemical, No Access/Ends Totally Buried/Submerged	**Comments:**

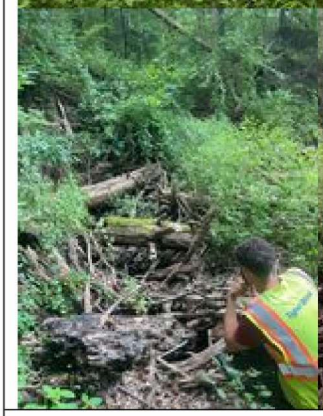
Photo Log

Road Photos

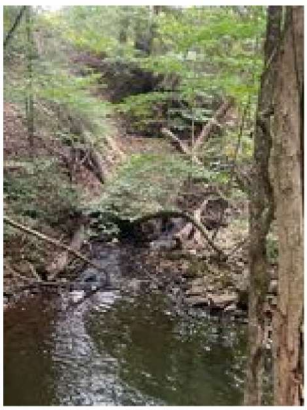



Upstream Photos



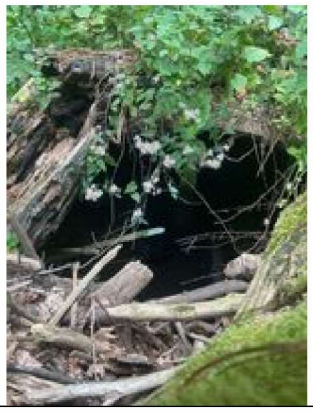
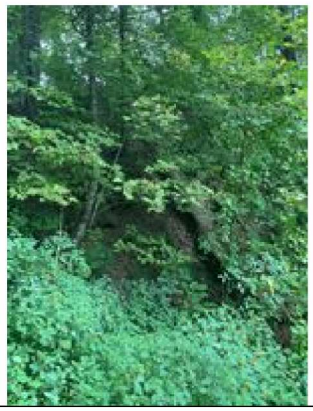



Downstream Embankment Photo


Crossing Inlet Photo



Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond August 29, 2024 10:23 AM

Culvert ID: Railroad-5	**Road name:** Rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Poor
Pavement Width: 0′ 0″	**Structure Length:** 70′ 0″
Road Observations: Overgrowth into path.	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Large stone in middle of structure followed by spanning stone settlement/deformation a few inches and sediment blockage about 50%. Cascade at inlet with poor channel alignment. Cannot see completely through structure from either end

Upstream Area

Approximate Bank full Width: 8′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Lots of debris.

Crossing Inlet - Located -

Inlet Shape: 6 - Box/Bridge with Abutments	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 4″ **Inlet Height:** 2′ 2″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 12′ 12″
Inlet Type: Wingwalls **Headwall Material:** None **Wingwall Material:** Stone	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream** **Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Critical***
Channel Alignment: ***Critical***
Level of Blockage: ***Adequate***
Flared End Section: ***NA***
Invert Deterioration: ***Poor***
Buoyancy or Crushing: **Adequate**
Cross-Section Deformation: ***Adequate***
Structural Integrity of Barrel: ***Critical***
Joints and Seams: ***Critical***
Footings: ***NA***
Headwall/Wingwalls: ***Poor***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Adequate***

Inlet Observations: Cascade several feet down to about a third of length. Minor scour visible from inlet at bottom of Cascade.

Downstream Area	
Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Wetland.	

Crossing Outlet - Located -			
Structure Material: Rock/Stone	**Outlet Shape:** 6 - Box/Bridge with Abutments	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 4″ **Outlet Height:** 1′ 0″

Crossing Dimensions	
Road Fill Height: 15′ 0″	
Headwall Material: None **Wingwall Material:** None	**Embankment Condition:** Poor
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2′ 4″ **Water Depth:** 0′ 0″	**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Critical*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Adequate***	Cross-Section Deformation: ***Critical*** Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***Critical*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***
Crossing Outlet Observations: Large stone in the middle of the structure. Wetland downstream and about half of the outlet opening is filled with silty/mud sediment.	

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 50%	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Faster
Physical Barriers: Debris/Sediment/Rock, Deformation	**Physical Barrier Severity:** Severe	**Physical Barrier Location:** Outlet
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Sediment Blockage > 1/2 the opening, Channel Degradation/Headcut, Poor Channel Alignment	**Comments:**

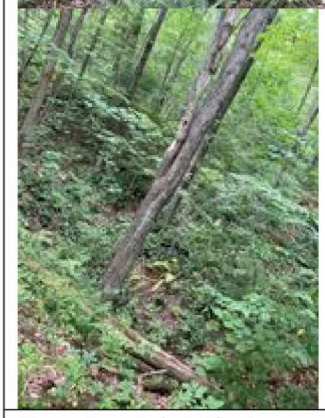
Photo Log

Road Photos




Upstream Photos





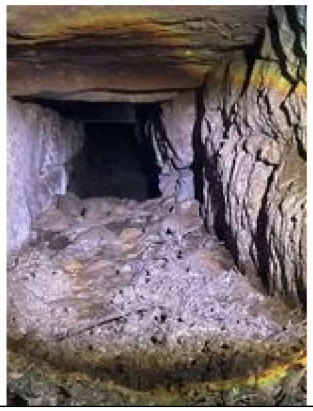
Downstream Embankment Photo






Crossing Inlet Photo






Crossing Outlet Photo







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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond August 29, 2024 11:04 AM

Culvert ID: Railroad-6	**Road name:** Rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Critical
Pavement Width: 0′ 0″	**Structure Length:** 75′ 0″
Road Observations: Overgrowth and trees on path.	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Undermining at inlet and outlet. Sediment blockage. Pile of stones at low point in crossing.

Upstream Area

Approximate Bank full Width: 8′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Debris (car seat at inlet).

Crossing Inlet - Located -

Inlet Shape: 6 - Box/Bridge with Abutments	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 4″ **Inlet Height:** 2′ 5″

Crossing Dimensions

Bend Mid-Crossing: Skewed (<45)	**Road Fill Height:** 8′ 8″
Inlet Type: None **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Large	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor***
Channel Alignment: ***Critical***	Joints and Seams: ***Poor***
Level of Blockage: ***Poor***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Scour of stone baffles and undermining of abutment stone wall at inlet.

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Wetland.	

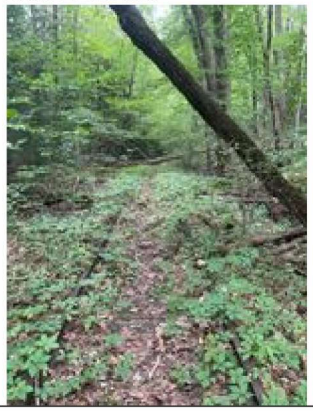
Crossing Outlet - Located -			
Structure Material: Rock/Stone	**Outlet Shape:** 6 - Box/Bridge with Abutments	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 6″ **Outlet Height:** 1′ 4″
Crossing Dimensions			
Road Fill Height: 12′ 0″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0′ 5″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Poor*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Deposit of large cobbles and stones within crossing at low point.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: Baffles/Weirs **Structure Substrate Matches Stream:** Contrasting	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 50%	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: Debris/Sediment/Rock, Dry	**Physical Barrier Severity:** Severe	**Physical Barrier Location:** Throughout. Pile of cobbles about midway.
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Sediment Blockage > 1/2 the opening, Local Outlet Scour, Poor Channel Alignment	**Comments:**

Photo Log

Road Photos




Upstream Photos

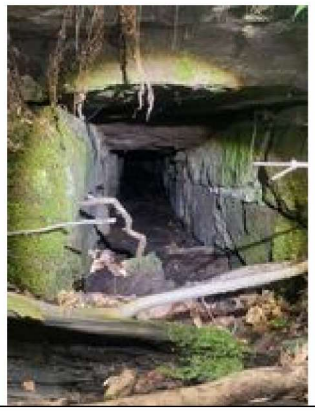


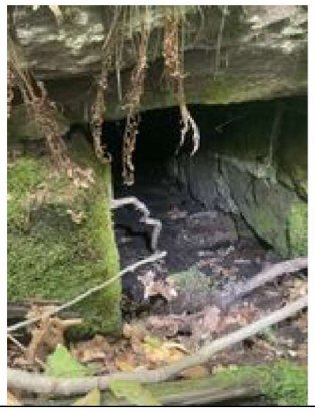
Downstream Embankment Photo





Crossing Inlet Photo



Crossing Outlet Photo











Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond August 29, 2024 11:34 AM

Culvert ID: Railroad-7	**Road name:** Rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Critical
Pavement Width: 0′ 0″	**Structure Length:** 28′ 0″
Road Observations: Overgrowth into path.	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** Poor channel alignment. Protruding outlet. Undermining at outlet with steep drop.

Upstream Area

Approximate Bank full Width: 4′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Runoff channel

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 10″ **Inlet Height:** 1′ 6″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Critical***	Joints and Seams: ***Adequate***
Level of Blockage: ***Poor***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Sediment and debris blockage. Water could not be measured or confirmed.

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Wetlands.	

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 2′ 0″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 2′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 4″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 6′ 6″ **Outlet Drop to Stream Bottom:** 6′ 2″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Large drop from invert protruding. Water depth fraction of an inch.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: Free Fall	**Physical Barrier Severity:** Severe	**Physical Barrier Location:** Outlet water undermining below
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Local Outlet Scour, Channel Degradation/Headcut, Poor Channel Alignment	**Comments:** Water at inlet could not be verified. Some water at outlet. Fraction of an inch deep.

Photo Log

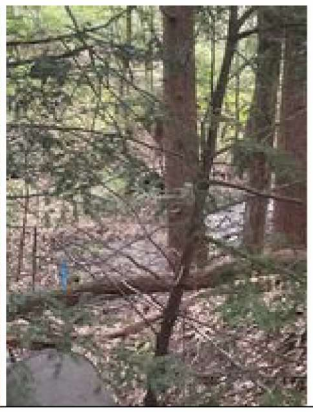
Road Photos




Upstream Photos




Downstream Embankment Photo

Crossing Inlet Photo





Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond August 29, 2024 4:17 PM

Culvert ID: Railroad-8	**Road name:** Rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Critical
Pavement Width: 0′ 0″	**Structure Length:** 80′ 0″
Road Observations: Overgrowth and fallen trees	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** Inlet erosion of embankment, undermining and inlet drop. Outlet scour, sediment build up within culvert. Cannot see through culvert. Potential large stone blockage within and roof stones appear to drop in elev. looking from outlet side.

Upstream Area

Approximate Bank full Width: 8′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Confluence.

Crossing Inlet - Located -

Inlet Shape: 6 - Box/Bridge with Abutments	**Inlet Grade:** Inlet Drop	**Inlet Width:** 2′ 0″ **Inlet Height:** 3′ 10″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 10′ 10″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Critical **Armoring/Riprap Condition:** Adequate

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Large	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream** **Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Poor***
Channel Alignment: ***Adequate***
Level of Blockage: ***Adequate***
Flared End Section: ***NA***
Invert Deterioration: ***Poor***
Buoyancy or Crushing: **Adequate**
Cross-Section Deformation: ***Adequate***
Structural Integrity of Barrel: ***Poor***
Joints and Seams: ***Adequate***
Footings: ***NA***
Headwall/Wingwalls: ***NA***
Armoring: ***Adequate***
Apron: ***NA***
Embankment Piping: ***Adequate***

Inlet Observations: Scour undermining at inlet under abutments for 6-8 feet long. Inlet drop. Saw large stone but could not get this in picture. Unclear if this is from roof stone or abutment.

Downstream Area	
Downstream Channel Bankfull Width: 4′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream: Meandering defined channel	

Crossing Outlet - Located -			
Structure Material: Rock/Stone	**Outlet Shape:** 6 - Box/Bridge with Abutments	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 6″ **Outlet Height:** 2′ 2″

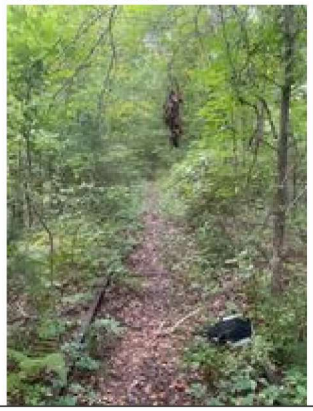
Crossing Dimensions	
Road Fill Height: 12′ 0″	
Headwall Material: None **Wingwall Material:** None	**Embankment Condition:** Adequate
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 8″ **Water Depth:** 0′ 0″	**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″
Outlet Condition: Structural (Longitudinal) Alignment: ***Poor*** Channel Alignment: ***Adequate*** Level of Blockage: ***Critical*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Poor***	Cross-Section Deformation: ***Poor*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***Poor*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***
Crossing Outlet Observations: Scour undermining stone abutments. Sediment build up within outlet. Very low clearance compared to inlet. Appears to be low spot within crossing and some stones may have settled.	

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Contrasting	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: Debris/Sediment/Rock, Deformation	**Physical Barrier Severity:** Moderate	**Physical Barrier Location:** Outlet half
Dry Passage through Structure? Unknown		

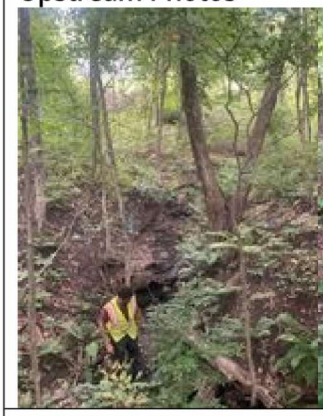
Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Local Outlet Scour, Channel Degradation/Headcut, Embankment Slope Instability, Poor Channel Alignment	**Comments:**

Photo Log

Road Photos




Upstream Photos




Downstream Embankment Photo




Crossing Inlet Photo





Crossing Outlet Photo






Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond August 29, 2024 3:49 PM

Culvert ID: Railroad-9	**Road name:** Rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Poor
Pavement Width: 0′ 0″	**Structure Length:** 25′ 0″
Road Observations: Overgrowth	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: No Flow	**Crossing Comments:** Large tree at inlet

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetland.

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 0″ **Inlet Height:** 2′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting, Headwall **Headwall Material:** Concrete **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Minor scour.

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream: Wetland

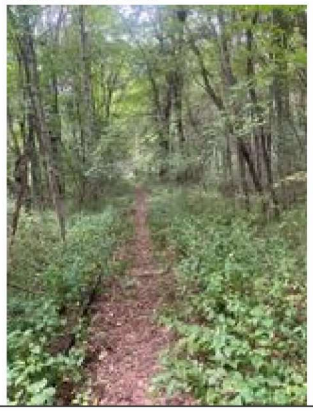
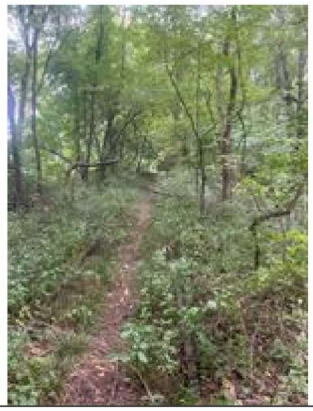
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Cascade	**Outlet Width:** 2′ 0″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 2′ 0″			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 6″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***Poor*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Apron at oulet			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: Fencing	**Physical Barrier Severity:** Minor	**Physical Barrier Location:** Inlet
Dry Passage through Structure? Yes		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos

Upstream Photos




Downstream Embankment Photo




Crossing Inlet Photo





Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 26, 2024 10:28 AM

Culvert ID: RattleHill-1	**Road name:** Rattlehill rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 20′ 0″	**Structure Length:** 25′ 0″
Road Observations: Longitudinal crack with poor embankments very narrow 2 lane rd	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Narrow road with no guardrail at crossing. Embankment slope instability. Ponding at inlet.

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Private property. Stream narrows down but pond buildup along inket

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 2″ **Inlet Height:** 1′ 2″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Critical **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 10″ **Water Depth:** 0′ 0″	**Tree Present by Upstream** **Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 8′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate
Tailwater Scour Pool: None	
Notes on Downstream:	

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 3″ **Outlet Height:** 0′ 11″
Crossing Dimensions			
Road Fill Height: 3′ 0″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 1″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Critical*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Sediment and debris blockage slowing flow and builds up water in pipe at outlet.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Debris/Sediment/Rock	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Embankment Slope Instability	**Comments:** Complaint from downstream owner that property floods from water overtopping road during rain events. Water ponds upstream of road

Photo Log

Road Photos

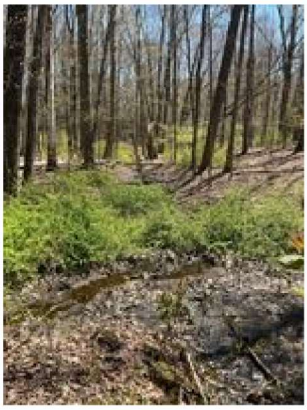




Upstream Photos

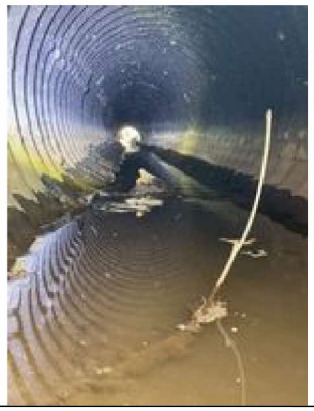


Downstream Embankment Photo


Crossing Inlet Photo



Crossing Outlet Photo



Southampton Culvert Assessment Form

Submitted By: Tighe&Bond April 5, 2024 8:04 AM

Culvert ID: Riverdale-1	**Road name:** Riverdale rd	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 20’ 0”	**Structure Length:** 31’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:** Two streams from opposite side or single stream that parts.

Upstream Area

Approximate Bank full Width: 11’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetland area on north stream side but similar channel bank full width

Crossing Inlet - Located -

Inlet Shape: 2 - Pipe Arch/Elliptical Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 5’ 0” **Inlet Height:** 2’ 0”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3’ 3”
Inlet Type: Headwall, Mitered to Slope **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 5’ 0” **Water Depth:** 1’ 1”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Critical***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***NA***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Poor***	Embankment Piping: ***Adequate***

Inlet Observations: Large stone at headwalls bending top of culvert

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate
Tailwater Scour Pool: None	
Notes on Downstream: River downstream. Muddy could not access outlet hands on	

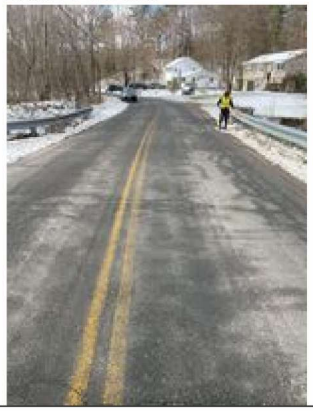
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 2 - Pipe Arch/Elliptical Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 5′ 0″ **Outlet Height:** 2′ 6″
Crossing Dimensions			
Road Fill Height: 4′ 2″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 5′ 0″ **Water Depth:** 1′ 1″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***NA*** Buoyancy or Crushing: ***Poor***		Cross-Section Deformation: ***Poor*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Could not access from stream. Dimensions confirmed from embankments			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

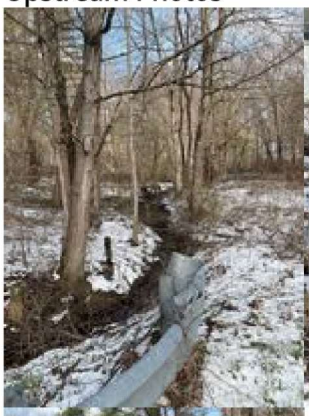
Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

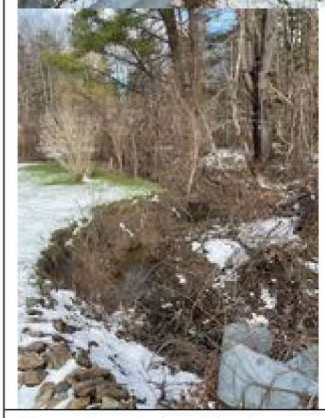
Photo Log

Road Photos




Upstream Photos

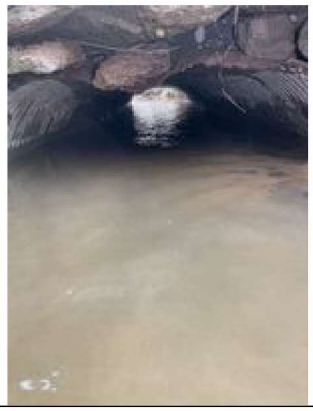




Downstream Embankment Photo



Crossing Inlet Photo

Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 7:39 AM

Culvert ID: Riverdale-2	**Road name:** Riverdale rd	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Poor
Pavement Width: 20′ 0″	**Structure Length:** 49′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Unknown
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 5′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Lots of vegetation

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 0″ **Inlet Height:** 1′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 5′ 5″
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Unknown***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Plastic inlet pipe

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream: River 30 ft downstream

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 4″ **Outlet Height:** 0′ 10″
Crossing Dimensions			
Road Fill Height: 5′ 6″			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 11″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Poor*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***		Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Crossing Outlet Observations: Submerged			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 50%	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:** No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo



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Southampton Culvert Assessment Form

ghe&Bond

Submitted By: Tighe&Bond April 9, 2024 8:55 AM

Culvert ID: Russellville-1	**Road name:** Russellville rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 25′ 0 ″	**Structure Length:** 37′ 6″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:** Masonry or similar type pipe

Upstream Area

Approximate Bank full Width: 5′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 3″ **Inlet Height:** 1′ 4″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Headwall **Headwall Material:** Concrete **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 2″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Poor***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Masonry pipe to concrete under road

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Combination	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 3″ **Outlet Height:** 1′ 4″
Crossing Dimensions			
Road Fill Height: 2′ 6″			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 11″ **Water Depth:** 1′ 1″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***		Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos



Upstream Photos



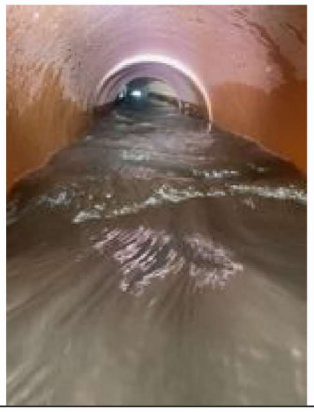
Downstream Embankment Photo





Crossing Inlet Photo







Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 9, 2024 10:13 AM

Culvert ID: Russellville-6	**Road name:** Russellville rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 31′ 0″	**Structure Length:** 45′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☑ Yes ☐ No	Both Sides	Asphalt Berm	Adequate
Guardrail	☑ Yes ☐ No	Both Sides		Poor

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Much of crossing could not be verified due to blocked outlet and modified catch basin inlet

Upstream Area

Approximate Bank full Width: 19′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Inlet Drop	**Inlet Width:** 0′ 0″ **Inlet Height:** 0′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3′ 3″
Inlet Type: Headwall & Wingwalls **Headwall Material:** Concrete **Wingwall Material:** Stone	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Unknown***	Structural Integrity of Barrel: ***Unknown***
Channel Alignment: ***Adequate***	Joints and Seams: ***Unknown***
Level of Blockage: ***Critical***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Unknown**	Apron: ***NA***
Cross-Section Deformation: ***Unknown***	Embankment Piping: ***Unknown***

Inlet Observations: Inlet is catchbasin modified to allow stream infiltration. Dims could not be verified

Downstream Area

Downstream Channel Bankfull Width: 0' 0" **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream:	

Crossing Outlet - Cannot Locate - Sediment obstruction, Other			
Structure Material:	**Outlet Shape:**	**Outlet Grade:**	**Outlet Width:** ' " **Outlet Height:** ' "
Crossing Dimensions			
Road Fill Height: ' "			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:**	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** ' " **Water Depth:** ' "		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ' " **Outlet Drop to Stream Bottom:** ' "	
Outlet Condition: Structural (Longitudinal) Alignment: Channel Alignment: Level of Blockage: Flared End Section: Invert Deterioration: Buoyancy or Crushing:		Cross-Section Deformation: Structural Integrity of Barrel: Joints and Seams: Footings: Headwall/Wingwalls: Apron: Embankment Piping:	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ' "
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: Debris/Sediment/Rock, Free Fall	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? Unknown		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Sediment Blockage > 1/2 the opening, No Access/Ends Totally Buried/Submerged	**Comments:** Unknown due to access and coverage

Photo Log

Road Photos




Upstream Photos



Downstream Embankment Photo




Crossing Inlet Photo






Crossing Outlet Photo

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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 26, 2024 9:56 AM

Culvert ID: Strong-1	**Road name:** Strong rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 25′ 0″	**Structure Length:** 50′ 0″
Road Observations: Some cracking but <10% of road	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Unknown
Flow Condition: Typical-Low	**Crossing Comments:** End buried at outlet

Upstream Area

Approximate Bank full Width: 6′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Flat

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 3″ **Inlet Height:** 1′ 2″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 7″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Poor***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Poor***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***Adequate***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Outlet not seen from inlet

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None
Notes on Downstream: No stream. Private property. Outlet blocked with sediment and brush and leaves

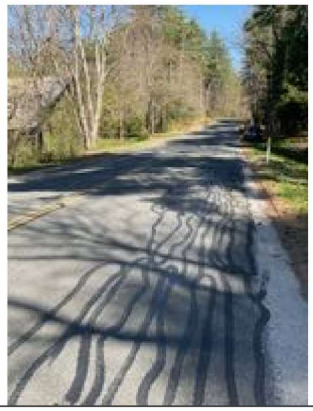
Crossing Outlet - Cannot Locate - Heavy Brush, Sediment obstruction			
Structure Material:	**Outlet Shape:**	**Outlet Grade:**	**Outlet Width:** ' " **Outlet Height:** ' "
Crossing Dimensions			
Road Fill Height: ' "			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:**	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** ' " **Water Depth:** ' "		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ' " **Outlet Drop to Stream Bottom:** ' "	
Outlet Condition: Structural (Longitudinal) Alignment: Channel Alignment: Level of Blockage: Flared End Section: Invert Deterioration: Buoyancy or Crushing:		Cross-Section Deformation: Structural Integrity of Barrel: Joints and Seams: Footings: Headwall/Wingwalls: Apron: Embankment Piping:	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ' "
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Debris/Sediment/Rock	**Physical Barrier Severity:** Severe	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** Sediment Blockage > 1/2 the opening, No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

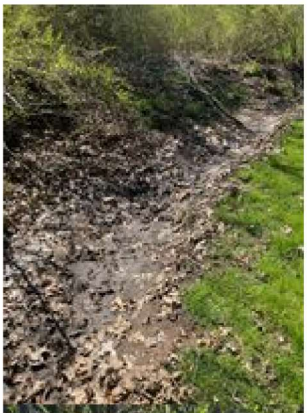
Road Photos

Upstream Photos




Downstream Embankment Photo





Crossing Inlet Photo





Crossing Outlet Photo

Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 26, 2024 9:26 AM

Culvert ID: Strong-2	**Road name:** Strong rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Poor
Pavement Width: 22′ 0″	**Structure Length:** 40′ 0″
Road Observations: Many cracks and fixes in road	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☑ Yes ☐ No	One Side	Asphalt Berm	Adequate
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Flared end deteriorated with scour pool.

Upstream Area

Approximate Bank full Width: 3′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Spans only bankfull/active channel	**Number of Barrels:** 1 **Observations:** Along private property

Crossing Inlet - Located -

Inlet Shape: 2 - Pipe Arch/Elliptical Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 6″ **Inlet Height:** 1′ 7″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 8″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***
Channel Alignment: ***Adequate***
Level of Blockage: ***Adequate***
Flared End Section: ***NA***
Invert Deterioration: ***Poor***
Buoyancy or Crushing: **Adequate**
Cross-Section Deformation: ***Adequate***
Structural Integrity of Barrel: ***Adequate***
Joints and Seams: ***Adequate***
Footings: ***NA***
Headwall/Wingwalls: ***Poor***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 3′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream: Golf course with several culverts downstream	

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 2 - Pipe Arch/Elliptical Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 2′ 6″ **Outlet Height:** 1′ 5″
Crossing Dimensions			
Road Fill Height: 6′ 0″			
Headwall Material: Stone **Wingwall Material:** Stone		**Embankment Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 4″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 1″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Critical*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Poor*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Critical*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Some deformation of pipe from rock			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Deeper **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Local Outlet Scour, Aggressive Abrasion/Corrosion/Chemical	**Comments:**

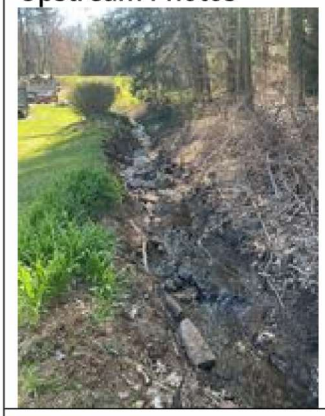
Photo Log

Road Photos

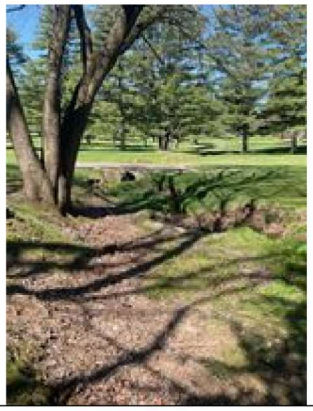




Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo









Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 19, 2024 6:33 AM

Culvert ID: TownHall-1	**Road name:** Maple St	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Driveway	**Condition:** Critical
Pavement Width: 0′ 0″	**Structure Length:** 430′ 0″
Road Observations: Town Hall. Erosion on edge of pavement. lots of cracking. Concerns entire parking lot, not just driveway.	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Unknown	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Structural failure at outlet/headwall. No catch basins between inlet and outlet. Culvert assumed continuous along full length.

Upstream Area

Approximate Bank full Width: 4′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Inlet Drop	**Inlet Width:** 2′ 4″ **Inlet Height:** 2′ 4″

Crossing Dimensions

Bend Mid-Crossing: Skewed (>45)	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting, Headwall **Headwall Material:** Concrete **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 4″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***
Channel Alignment: ***Adequate***
Level of Blockage: ***Critical***
Flared End Section: ***NA***
Invert Deterioration: ***Adequate***
Buoyancy or Crushing: **Adequate**
Cross-Section Deformation: ***Adequate***
Structural Integrity of Barrel: ***Adequate***
Joints and Seams: ***Adequate***
Footings: ***NA***
Headwall/Wingwalls: ***Adequate***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Adequate***

Inlet Observations: Fence above concrete headwall. Build up debris and sediment acting as blockage exceeding half of the opening. Water is getting through, seeping through sides under normal flow conditions.

Downstream Area	
Downstream Channel Bankfull Width: 5′ 6″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream:	

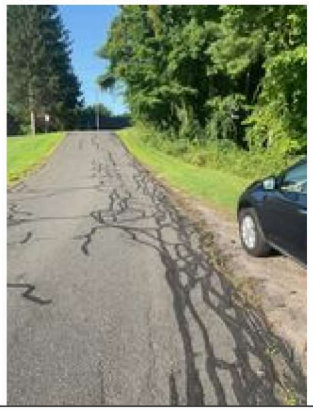
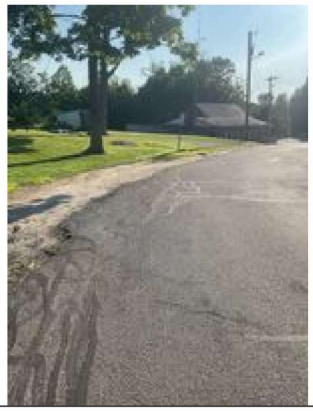
Crossing Outlet - Located -			
Structure Material: Concrete	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 2′ 6″ **Outlet Height:** 2′ 6″
Crossing Dimensions			
Road Fill Height: 12′ 0″			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0′ 7″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 3′ 3″ **Outlet Drop to Stream Bottom:** 3′ 8″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Critical*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Critical*** Footings: ***NA*** Headwall/Wingwalls: ***Critical*** Apron: ***NA*** Embankment Piping: ***Poor***	
Crossing Outlet Observations: Bottom of headwall eroded due to scour pool. Pipe/headwall leaning forward 4-6 inches. Vertical misalignment approximately 5 inches. Seem displacement along last 2 pre cast units.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Local Outlet Scour, Embankment Slope Instability, Embankment Piping	**Comments:**

Photo Log

Road Photos

Upstream Photos

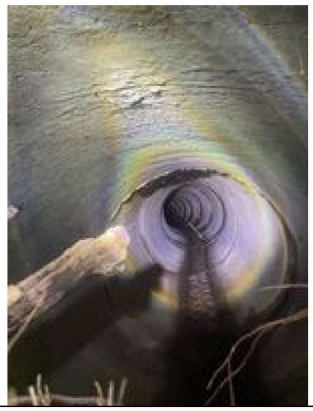





Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo







Southampton Culvert Assessment Form

ghe&Bond

Submitted By: Tighe&Bond April 9, 2024 7:30 AM

Culvert ID: Valley-1	**Road name:** Valley rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 22′ 6″	**Structure Length:** 57′ 6″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☑ Yes ☐ No	One Side	Asphalt Berm	Adequate
Guardrail	☑ Yes ☐ No	One Side		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 18′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Confluence 2 streams coming from east and north. North side stream bank full is about 7′

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 0″ **Inlet Height:** 1′ 10″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 5′ 5″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1′ 4″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Poor***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 11′ 6″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: Small
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 2′ 0″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 5′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1′ 1″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 1′ 6″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos

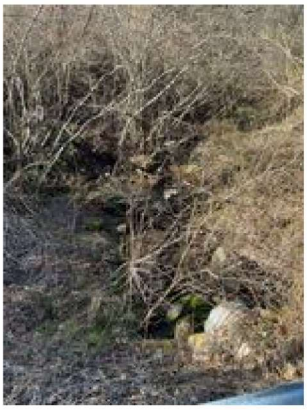



Upstream Photos

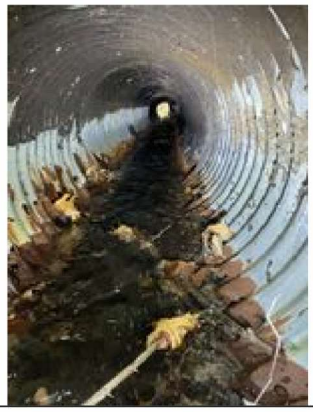




Downstream Embankment Photo




Crossing Inlet Photo


Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 21, 2024 12:21 PM

Culvert ID: Valley-2	**Road name:** Valley road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21′ 5″	**Structure Length:** 41′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Unknown
Flow Condition: No Flow	**Crossing Comments:** Culvert is non visible. Outlet area is submerged. Both sides are covered by debris and water. Inlet structure may also be submerged in water and debris

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Upstream is just a pond.

Crossing Inlet - Cannot Locate - Debris, Heavy Brush, Sediment obstruction

Inlet Shape:	**Inlet Grade:**	**Inlet Width:** ′ ″ **Inlet Height:** ′ ″

Crossing Dimensions

Bend Mid-Crossing:	**Road Fill Height:** ′ ″
Inlet Type: **Headwall Material:** Concrete **Wingwall Material:** None	**Embankment Condition:** **Armoring/Riprap Condition:**

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** ′ ″ **Water Depth:** ′ ″	**Tree Present by Upstream** **Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment:	Structural Integrity of Barrel:
Channel Alignment:	Joints and Seams:
Level of Blockage:	Footings:
Flared End Section:	Headwall/Wingwalls:
Invert Deterioration:	Armoring:
Buoyancy or Crushing:	Apron:
Cross-Section Deformation:	Embankment Piping:

Inlet Observations:

Downstream Area	
Downstream Channel Bankfull Width: 0' 0" **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Non visible outlet. Wetland area. Too much debris to see much of anything.	

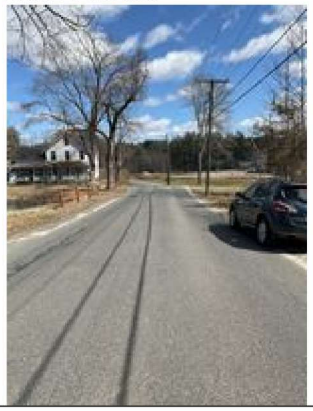
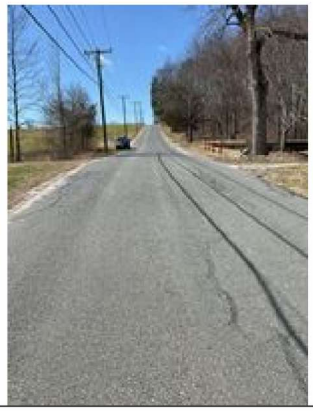
Crossing Outlet - Cannot Locate - Debris, Heavy Brush, Sediment obstruction			
Structure Material:	**Outlet Shape:**	**Outlet Grade:**	**Outlet Width:** ' " **Outlet Height:** ' "
Crossing Dimensions			
Road Fill Height: ' "			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:**	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** ' " **Water Depth:** ' "		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ' " **Outlet Drop to Stream Bottom:** ' "	
Outlet Condition: Structural (Longitudinal) Alignment: Channel Alignment: Level of Blockage: Flared End Section: Invert Deterioration: Buoyancy or Crushing:		Cross-Section Deformation: Structural Integrity of Barrel: Joints and Seams: Footings: Headwall/Wingwalls: Apron: Embankment Piping:	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ' "
Internal Structures: Other **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: Debris/Sediment/Rock	**Physical Barrier Severity:** Severe	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Sediment Blockage > 1/2 the opening, Channel Degradation/Headcut, No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

Road Photos

Upstream Photos







Downstream Embankment Photo







Crossing Inlet Photo

Crossing Outlet Photo

Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 21, 2024 1:21 PM

Culvert ID: Valley-4	**Road name:** Valley road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 19′ 3″	**Structure Length:** 40′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Other

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Unknown
Flow Condition: Typical-Low	**Crossing Comments:** Outlet not visible. Covered by dead branches from tree, sediment, debris and likely submerged

Upstream Area

Approximate Bank full Width: 3′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Spans only bankfull/active channel	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2′ 6″ **Inlet Height:** 2′ 3″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 4″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 3' 6" **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate
Tailwater Scour Pool: None	
Notes on Downstream:	

Crossing Outlet - Cannot Locate - Debris, Heavy Brush, Sediment obstruction			
Structure Material:	**Outlet Shape:**	**Outlet Grade:**	**Outlet Width:** ' " **Outlet Height:** ' "
Crossing Dimensions			
Road Fill Height: ' "			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:**	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** ' " **Water Depth:** ' "		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ' " **Outlet Drop to Stream Bottom:** ' "	
Outlet Condition: Structural (Longitudinal) Alignment: Channel Alignment: Level of Blockage: Flared End Section: Invert Deterioration: Buoyancy or Crushing:		Cross-Section Deformation: Structural Integrity of Barrel: Joints and Seams: Footings: Headwall/Wingwalls: Apron: Embankment Piping:	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ' "
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: Debris/Sediment/Rock	**Physical Barrier Severity:** Severe	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Sediment Blockage > 1/2 the opening	**Comments:**

Photo Log

Road Photos







Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo

Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 18, 2024 6:23 AM

Culvert ID: Valley-5	**Road name:** Valley Rd.	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Critical
Pavement Width: 17′ 4″	**Structure Length:** 39′ 6″
Road Observations: Extensive cracking of pavement. Settlement in road by culvert. Cracking along length and width	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: No Flow	**Crossing Comments:** Catch basin at outlet

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Private property field mowed grass

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 0″ **Inlet Height:** 1′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1′ 1″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream** **Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Dry

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Bankfull width could not be verified. Vegetation and no defined channel	

Crossing Outlet - Located -			
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 0″ **Outlet Height:** 1′ 0″
Crossing Dimensions			
Road Fill Height: 3′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Adequate*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Masonry catch basin at outlet just outside of flared end. Dry			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: Dry	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? Unknown		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos





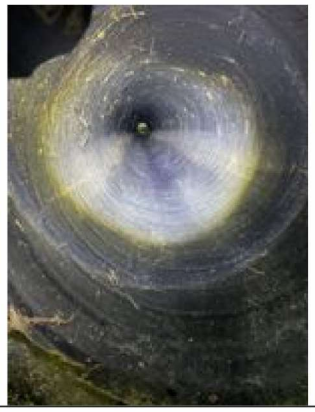

Upstream Photos




Downstream Embankment Photo

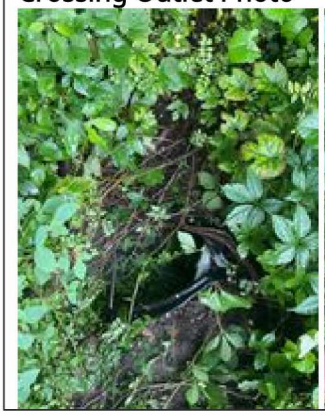



Crossing Inlet Photo



Crossing Outlet Photo





Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 18, 2024 7:08 AM

Culvert ID: Valley-6	**Road name:** Valley Rd	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Poor
Pavement Width: 20′ 0″	**Structure Length:** 40′ 0″
Road Observations: Signifigant cracking and repairs.	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** Water ponding at inlet to mid length. Minor deformation at inlet.

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Stagnant water.

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 0″ **Inlet Height:** 0′ 10″

Crossing Dimensions

Bend Mid-Crossing: Skewed (<45)	**Road Fill Height:** 2′ 2″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 11″ **Water Depth:** 0′ 0″	**Tree Present by Upstream** **Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Water is stagnant at inlet.

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Wire fence approximately 5 ft from outlet. Wetlands.	

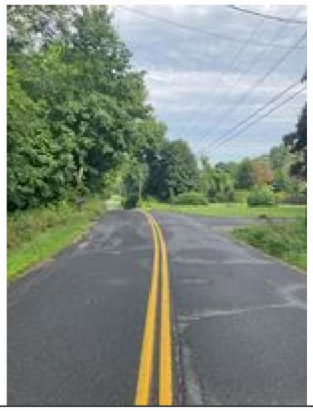
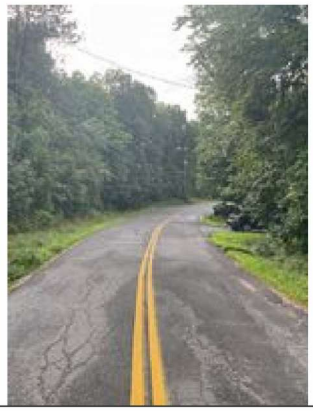
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1′ 0″ **Outlet Height:** 1′ 0″
Crossing Dimensions			
Road Fill Height: 2′ 8″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Stones placed over outlet.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** No - Deeper **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Other	**Physical Barrier Severity:** Moderate	**Physical Barrier Location:** Ponding from inlet to mid length.
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:**	**Comments:**

Photo Log

Road Photos

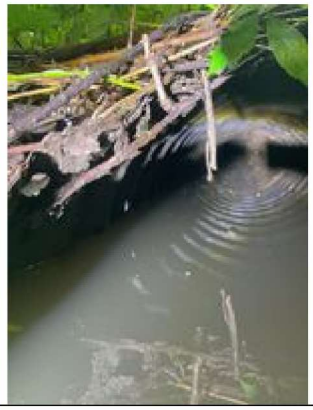
Upstream Photos

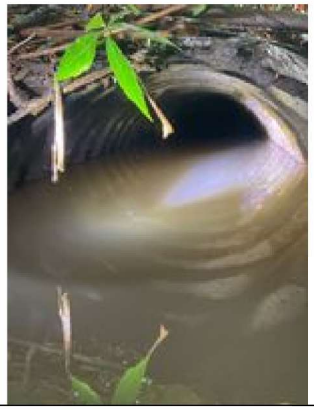



Downstream Embankment Photo



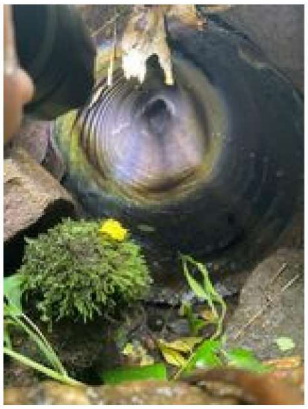

Crossing Inlet Photo

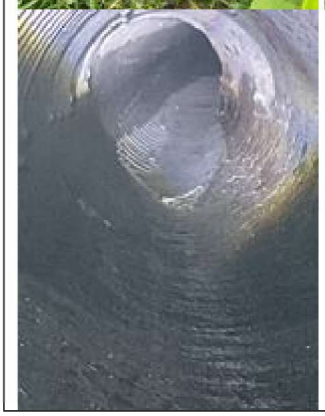





Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 26, 2024 8:41 AM

Culvert ID: Whiteloaf-1	**Road name:** Whiteloaf rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 27′ 0″	**Structure Length:** 75′ 0″
Road Observations: Some cracking < 10% road	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (>45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:** Flared ends with apron are severely deteriorated. Leads to freefall at outlet. Pipe itself is ok.

Upstream Area

Approximate Bank full Width: 12′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Stream widens upstream. Defined stream along first 400-500 ft

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 11″ **Inlet Height:** 2′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 5′ 5″
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Critical***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 9′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream: Deep meander bank cuts along stream	

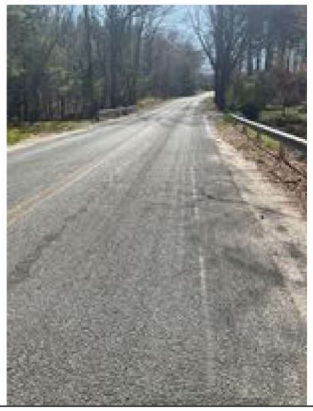
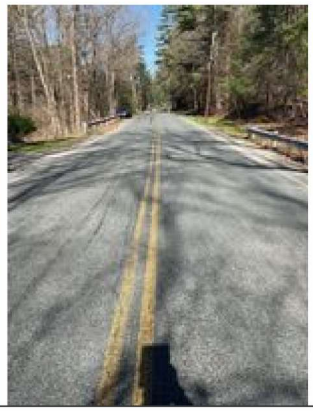
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1′ 11″ **Outlet Height:** 2′ 1″
Crossing Dimensions			
Road Fill Height: 9′ 0″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0′ 9″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 8″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Critical*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Poor*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Some deflection of pipe along seem			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

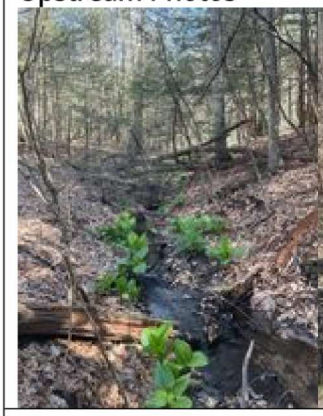
Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Local Outlet Scour, Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

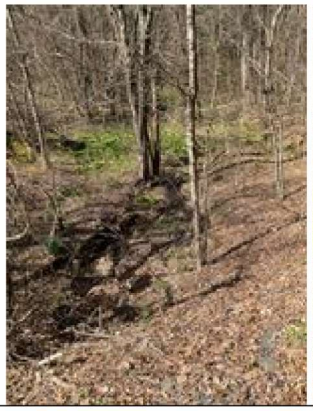
Road Photos

Upstream Photos




Downstream Embankment Photo



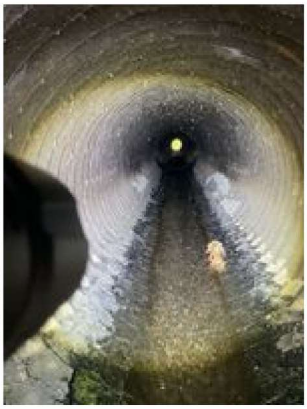

Crossing Inlet Photo







Crossing Outlet Photo




Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 26, 2024 7:47 AM

Culvert ID: Whiteloaf-2	**Road name:** Whiteloaf rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 24′ 0″	**Structure Length:** 44′ 0″
Road Observations: Crack across rd not in line with culvert skew	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Outlet appears to be a catch basin that is buried.

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetland

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 8″ **Inlet Height:** 1′ 7″

Crossing Dimensions

Bend Mid-Crossing: Skewed (<45)	**Road Fill Height:** 3′ 3″
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations: Outlet not seen from inlet

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Wetlands	

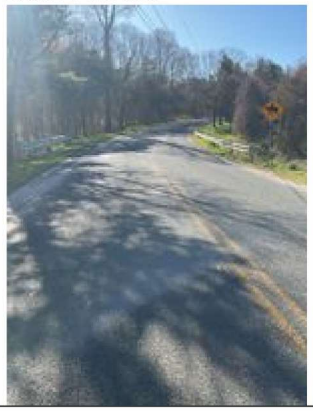
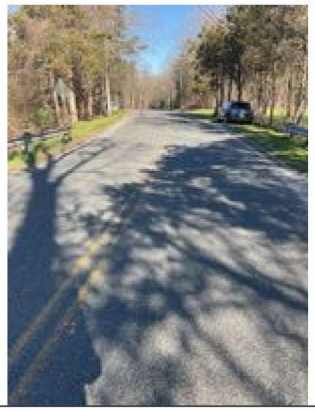
Crossing Outlet - Located **-**			
Structure Material: Metal	**Outlet Shape:** 1 **-** Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 0′ 0″ **Outlet Height:** 0′ 0″
Crossing Dimensions			
Road Fill Height: 5′ 3″			
Headwall Material: Stone **Wingwall Material:** Stone		**Embankment Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Adequate*** Level of Blockage: ***Critical*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Critical***		Cross-Section Deformation: ***Critical*** Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***Critical*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Crossing Outlet Observations: Outlet submerged. Headwalls stones have cracked and shifted leaving gaps. Water runoff from road eroding soil by pavement			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Deeper **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Deformation	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Aggressive Abrasion/Corrosion/Chemical, Buoyancy or Crushing-Related Inltet Failure, No Access/Ends Totally Buried/Submerged	**Comments:**

Photo Log

Road Photos

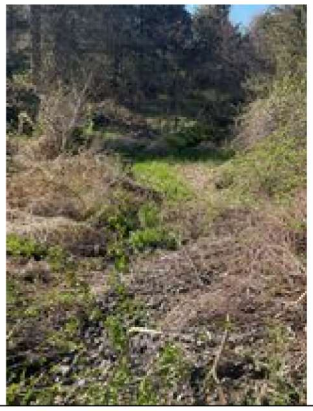





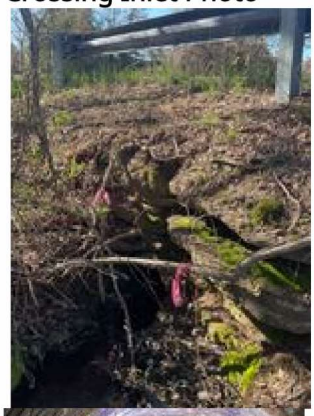
Upstream Photos



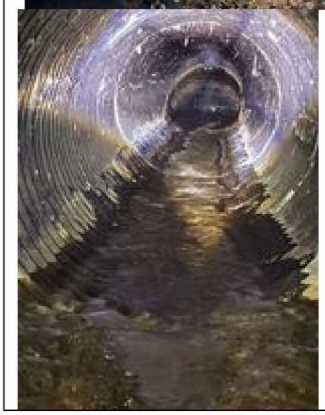

Downstream Embankment Photo



Crossing Inlet Photo







Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 21, 2024 2:20 PM

Culvert ID: Whiteloaf-3	**Road name:** White loaf road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 26′ 0″	**Structure Length:** 47′ 6″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	One Side		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Spans only bankfull/active channel	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 9″ **Inlet Height:** 1′ 11″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 6′ 6″	
Inlet Type: Wingwalls **Headwall Material:** Concrete **Wingwall Material:** Concrete	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA	
Scour: Yes **Scour Location:** Wingwalls **Scour Damage:** Large	**Substrate/Water Width:** 1′ 6″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***NA***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Poor***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 2′ 6″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None
Notes on Downstream:

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 2′ 6″ **Outlet Height:** 2′ 0″
Crossing Dimensions			
Road Fill Height: 7′ 7″			
Headwall Material: Stone **Wingwall Material:** Stone		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 2′ 3″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** 0′ 0″ **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 0″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***NA*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations: Obstructions (gravel and large rock) can be seen approximately mid-length from the outlet of the culvert. There is severe deterioration in the middle of the culvert.			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** Contrasting	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: Debris/Sediment/Rock, Free Fall	**Physical Barrier Severity:** Minor	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Aggressive Abrasion/Corrosion/Chemical	**Comments:**

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo











Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond May 1, 2024 2:00 PM

Culvert ID: Wolcott-2	**Road name:** Wolcott rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Unpaved	**Condition:** Poor
Pavement Width: 17′ 0″	**Structure Length:** 27′ 0″
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetlands

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1′ 0″ **Inlet Height:** 1′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 0′ 0″
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0′ 7″ **Water Depth:** 0′ 0″	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Inlet Observations:

Downstream Area

Downstream Channel Bankfull Width: 0′ 0″ **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Small
Notes on Downstream: Stream flattens out. Banks cannot be defined

Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 1′ 0″ **Outlet Height:** 1′ 0″
Crossing Dimensions			
Road Fill Height: 1′ 8″			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0′ 5″ **Water Depth:** 0′ 0″		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0′ 0″ **Outlet Drop to Stream Bottom:** 0′ 3″	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ′ ″
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** No - Faster
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:**

Photo Log

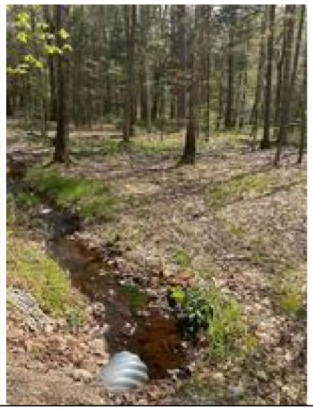
Road Photos




Upstream Photos

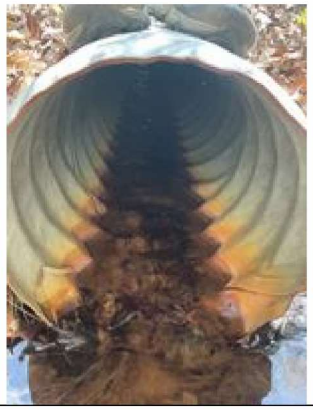
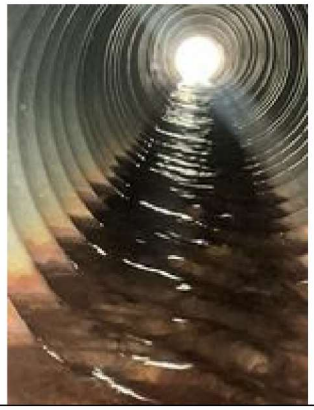


Downstream Embankment Photo

Crossing Inlet Photo



Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond May 1, 2024 2:41 PM

Culvert ID: Wolcott-3	**Road name:** wolcott rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Unpaved	**Condition:** Poor
Pavement Width: 15′ 0″	**Structure Length:** 37′ 0″
Road Observations: Utility line very low. span is very long between poles. ruts in road. road erodes away and owner has to refill once every 2 years on average. it had just been filled in not long back according to owner	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** dry

Upstream Area

Approximate Bank full Width: 0′ 0″ **Width Confidence:** Low/Estimated **Constriction:** Spans only bankfull/active channel	**Number of Barrels:** 1 **Observations:** owner placed stones along opening since this area floods and erodes some of soil.

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Perched	**Inlet Width:** 1′ 0″ **Inlet Height:** 1′ 0″

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 0′ 0″	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Armoring/Riprap Condition:** NA	
Scour: Yes **Scour Location:** Culvert **Scour Damage:** Large	**Substrate/Water Width:** 0′ 0″ **Water Depth:** 0′ 0″	**Tree Present by Upstream** **Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Critical***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Critical***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***NA***	Armoring: ***NA***
Buoyancy or Crushing: **Critical**	Apron: ***NA***
Cross-Section Deformation: ***Critical***	Embankment Piping: ***Adequate***

Inlet Observations: inlet sound but through culvert can see a lot of soil infiltration at end. Outlet appears to be collapse or covered with soil

Downstream Area

Downstream Channel Bankfull Width: 5' 6" **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: steep banks along 50 ft of outlet. the land flattens out after this with no stream defined	

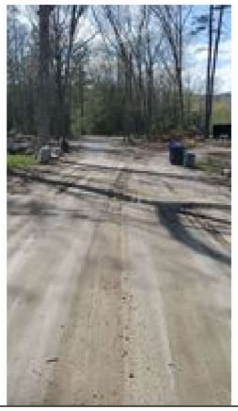
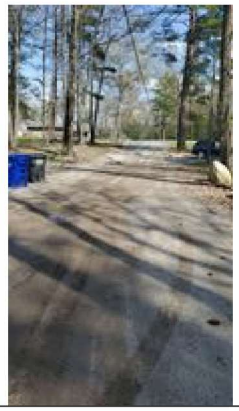
Crossing Outlet - Cannot Locate - Debris, Sediment obstruction, Full Collapse			
Structure Material:	**Outlet Shape:**	**Outlet Grade:**	**Outlet Width:** ' " **Outlet Height:** ' "
Crossing Dimensions			
Road Fill Height: ' "			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:**	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** ' " **Water Depth:** ' "		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ' " **Outlet Drop to Stream Bottom:** ' "	
Outlet Condition: Structural (Longitudinal) Alignment: Channel Alignment: Level of Blockage: Flared End Section: Invert Deterioration: Buoyancy or Crushing:		Cross-Section Deformation: Structural Integrity of Barrel: Joints and Seams: Footings: Headwall/Wingwalls: Apron: Embankment Piping:	
Crossing Outlet Observations:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ' "
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Dry **Water Velocity Matches Stream:** Dry
Physical Barriers: Debris/Sediment/Rock	**Physical Barrier Severity:** Severe	**Physical Barrier Location:** outlet
Dry Passage through Structure? Unknown		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Sediment Blockage > 1/2 the opening, Previous and/or Frequent Overtopping, No Access/Ends Totally Buried/Submerged	**Comments:** no water so currently dry passage.

Photo Log

Road Photos

Upstream Photos



Downstream Embankment Photo




Crossing Inlet Photo






Crossing Outlet Photo

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Follow-Up Assessments
October 15, 2024

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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 1:11 PM

Culvert ID: ColdSpring-2	**Road name:** Cold spring rd	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 32’ 0”	**Structure Length:** 52’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 12’ 0” 4'-6" **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Farmland very wet

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2’ 0” **Inlet Height:** 2’ 0”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 4’ 4”
Inlet Type: Headwall **Headwall Material:** Stone **Wingwall Material:** Stone	**Embankment Condition:** Adequate **Headwall Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1’ 10” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Unknown***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Critical***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:**

Downstream Area

Downstream Channel Bankfull Width: 12’ 0” **Width Confidence:** Low/Estimated 7'-0"	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream:	

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Clogged/collapsed/sub merged	**Outlet Width:** 2’ 0” **Outlet Height:** 1’ 6”

Crossing Dimensions	
Road Fill Height: 5’ 4”	
Headwall Material: Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** Poor
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2’ 0” **Water Depth:** 1’ 1”	**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Adequate*** Level of Blockage: ***Unknown*** Flared End Section: ***Critical*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***	Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** critical Apron: ***NA*** Embankment Piping: ***Unknown***
Condition of Downstream Embankment: Adequate	**Crossing Outlet Observations:** Outlet is submerged. Not clearly visible in photo. There is a drain pipe in front
Severity Ranking	
Embankment Piping: Unknown	
Cross-section Deformation: Unknown	

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** No Access/Ends Totally Buried/Submerged	**Comments:** Could be MVP or borderline DPW project. Headwalls need replacement

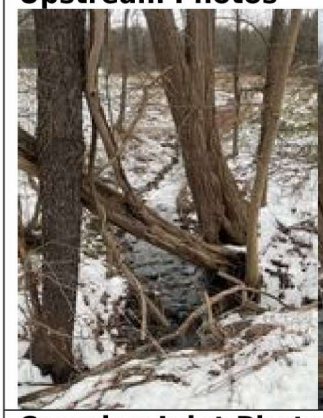
was still partially submerged at time of inspection

Photo Log

Road Photos




Upstream Photos




Downstream Embankment Photo




Crossing Inlet Photo






Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 10:19 AM

Culvert ID: Cook-1	**Road name:** Cook road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 25’ 0”	**Structure Length:** 39’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low Dry	**Crossing Comments:** ~~Both ends are completely submerged~~ culverts are blocked with sediment

Upstream Area

Approximate Bank full Width: 0’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 2 **Observations:** Wetland upstream
Distance Between Culvert Barrels: 2’ 0”	

Crossing Inlet - Barrel 1- Cannot Locate - Sediment obstruction

Inlet Shape: round	**Inlet Grade:** Below	**Inlet Width:** 2’ 6” **Inlet Height:** 1’ 0”

Crossing Dimensions

Bend Mid-Crossing: none	**Road Fill Height:** ’ ” 1'-6"	
Inlet Type: **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** **Headwall Condition:** NA **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 2’ 6” **Water Depth:** 1’ 1”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Unknown*** OK
Channel Alignment: ***Poor***	Joints and Seams: ***Unknown*** OK
Level of Blockage: ***Critical***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Unknown*** OK	Armoring: ***NA***
Buoyancy or Crushing: **Unknown** OK	Apron: ***NA***
Cross-Section Deformation: ***Unknown*** OK	Embankment Piping: ***Unknown*** OK

Cross-section Deformation: Unknown **Embankment Piping:** Unknown	**Inlet Observations:**

Crossing Inlet - Barrel 2- Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** ~~Clogged/Collapsed/Submerged~~	**Inlet Width:** 2’ 6” **Inlet Height:** 1’ 0”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1’ 1”
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** NA **Armoring/Riprap Condition:** NA

Southampton Culvert Assessment Form

Tighe&Bond

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 2’ 6” **Water Depth:** 1’ 1”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Unknown*** OK
Channel Alignment: ***Poor***
Level of Blockage: ***Poor***
Flared End Section: ***NA***
Invert Deterioration: ***Unknown*** OK
Buoyancy or Crushing: **Unknown** OK
Cross-Section Deformation: ***Unknown*** OK

Structural Integrity of Barrel: ***Unknown*** OK
Joints and Seams: ***Unknown*** OK
Footings: ***NA***
Headwall/Wingwall: ***NA***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Unknown*** OK

Cross-section Deformation: Unknown **Embankment Piping:** Unknown	**Inlet Observations:**

Downstream Area

Downstream Channel Bankfull Width: 0’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 2 **Constriction:** Moderate

Tailwater Scour Pool: Small

Distance Between Culvert Barrels: 2’ ”

Notes on Downstream:

Crossing Outlet - Barrel 1 - Located -

Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** ~~Clogged/collapsed/sub~~ merged	**Outlet Width:** 2’ 0” **Outlet Height:** 1’ 2”

Crossing Dimensions

Road Fill Height: 3’ 0”

Headwall Material: None **Wingwall Material:** None	**Embankment Condition:** Critical **Headwall Condition:** NA
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2’ 0” **Water Depth:** 1’ 1”	**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”

Outlet Condition:

Structural (Longitudinal) Alignment: ***Unknown*** OK
Channel Alignment: ***Poor***
Level of Blockage: ***Unknown*** Critical
Flared End Section: ***NA***
Invert Deterioration: ***Unknown*** OK
Buoyancy or Crushing: ***Unknown*** OK

Cross-Section Deformation: ***Unknown*** OK
Structural Integrity of Barrel: ***Unknown*** OK
Joints and Seams: ***Unknown*** OK
Footings: ***NA***
Headwall/Wingwall: ***NA***
Apron: ***NA***
Embankment Piping: ***Unknown*** OK

Condition of Downstream Embankment: Critical	**Crossing Outlet Observations:** ~~Completely submerged~~

Severity Ranking

Embankment Piping: Unknown

Cross-section Deformation: Unknown

Crossing Outlet - Barrel 2 - Located -

Structure Material: ~~Metal~~ HDPE	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Clogged/collapsed/sub ~~merged~~	**Outlet Width:** 2’ 4” 2'-0" **Outlet Height:** 1’ 4”

Crossing Dimensions

Road Fill Height: 3’ 0”

Headwall Material: None **Wingwall Material:** None	**Embankment Condition:** Critical **Headwall Condition:** NA

Southampton Culvert Assessment Form

Tighe&Bond

Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2’ 4” **Water Depth:** 1’ 1”	**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”
Outlet Condition: OK Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Poor*** Level of Blockage: ***Unknown*** critical Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** OK Buoyancy or Crushing: ***Unknown*** OK	Cross-Section Deformation: ***Unknown*** OK Structural Integrity of Barrel: ***Unknown*** OK Joints and Seams: ***Unknown*** OK Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown*** OK
Condition of Downstream Embankment: Critical	**Crossing Outlet Observations:** ~~Completely submerged~~
Severity Ranking	
Embankment Piping: Unknown	
Cross-section Deformation: Unknown	

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** 50%	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** Unknown
Physical Barriers: Debris/Sediment/Rock	**Physical Barrier Severity:** Severe	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Sediment Blockage > 1/2 the opening, Previous and/or Frequent Overtopping, Channel Degradation/Headcut, Embankment Slope Instability, ~~No Access/Ends Totally Buried/Submerged~~	**Comments:** Pipes are in good condition, but blocked with sand and below grade which is why they are filling up with sediment. Sediment traps and dredging can be considered. alternatively, raising the roadway. If there are flooding issues downstream, then no benefit of raising pipes.

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo

Crossing Outlet Photo



Inlet 1



Inlet 2



Outlet 1





Outlet 2





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 15, 2024 9:34 AM

Culvert ID: CrookedLedge-3	**Road name:** Crooked lane road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Unpaved	**Condition:** Critical
Pavement Width: 14’ 0”	**Structure Length:** 22’ 0”
Road Observations: Gravel road	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Submerged

Upstream Area

Approximate Bank full Width: 0’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Pond

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** ’ ” **Inlet Height:** 4’ 0”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1’ 1”
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Critical **Headwall Condition:** Unknown **Armoring/Riprap Condition:** Unknown

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** ’ ” **Water Depth:** 3’ 3”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Unknown***	Structural Integrity of Barrel: ***Unknown***
Channel Alignment: ***Adequate***	Joints and Seams: ***Unknown***
Level of Blockage: ***Unknown***	Footings: ***Unknown***
Flared End Section: ***Unknown***	Headwall/Wingwalls: ***Unknown***
Invert Deterioration: ***Unknown***	Armoring: ***Unknown***
Buoyancy or Crushing: **Unknown**	Apron: ***NA***
Cross-Section Deformation: ***Unknown***	Embankment Piping: ***Unknown***

Cross-section Deformation: Unknown **Embankment Piping:** Unknown	**Inlet Observations:** Almost completely submerged. Many dims could not be verified.

Downstream Area

Downstream Channel Bankfull Width: 0’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Pond	

Crossing Outlet - Cannot Locate - High water

Southampton Culvert Assessment Form

Tighe&Bond

Structure Material:	**Outlet Shape:**	**Outlet Grade:**	**Outlet Width:** ’ ” **Outlet Height:** ’ ”
Crossing Dimensions			
Road Fill Height: ’ ”			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** **Headwall Condition:**	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** ’ ” **Water Depth:** ’ ”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ’ ” **Outlet Drop to Stream Bottom:** ’ ”	
Outlet Condition: Structural (Longitudinal) Alignment: Channel Alignment: Level of Blockage: Flared End Section: Invert Deterioration: Buoyancy or Crushing:		Cross-Section Deformation: Structural Integrity of Barrel: Joints and Seams: Footings: Headwall/Wingwalls: Apron: Embankment Piping:	
Condition of Downstream Embankment:		**Crossing Outlet Observations:**	
Severity Ranking			
Embankment Piping:			
Cross-section Deformation:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: Fencing	**Physical Barrier Severity:** Moderate	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Embankment Slope Instability, No Access/Ends Totally Buried/Submerged	**Comments:** Could not access. Same condition. wide wetland area. condition of invert of pipe unknown. minimal traffic

Photo Log

Road Photos





Upstream Photos



Downstream Embankment Photo







Crossing Inlet Photo



Crossing Outlet Photo

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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 15, 2024 9:09 AM

Culvert ID: CrookedLedge-4	**Road name:** Crooked lane road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Critical
Pavement Width: 20’ 0”	**Structure Length:** 39’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor OK
Flow Condition: Typical-Low dry	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetlands

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1’ 2” **Inlet Height:** 1’ 1”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1’ 1”
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** NA **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1’ 2” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor*** ok
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Critical*** poor	Embankment Piping: ***Adequate***

Cross-section Deformation: Critical poor **Embankment Piping:** Adequate	**Inlet Observations:**

Downstream Area

Downstream Channel Bankfull Width: 0’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Wetlands	

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1’ 2” **Outlet Height:** 0’ 11”
Crossing Dimensions			
Road Fill Height: 1’ 8”			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate **Headwall Condition:** NA	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0’ 5” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** ok Buoyancy or Crushing: ***Unknown*** ok		Cross-Section Deformation: ***Unknown*** ok Structural Integrity of Barrel: ***Unknown*** ok Joints and Seams: ***Unknown*** ok Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown*** ok	
Condition of Downstream Embankment: Adequate		**Crossing Outlet Observations:** Almost submerged. Water width is taken at top	
Severity Ranking			
Embankment Piping: Unknown			
Cross-section Deformation: Unknown			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Deeper **Water Velocity Matches Stream:** Unknown
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** ~~No Access/Ends Totally Buried/Submerged~~	**Comments:** just a cross culvert. Only issue is with stone bending through top of pipe about 2 inches and is only a few feet in pipe. ~~Town can fix easily.~~

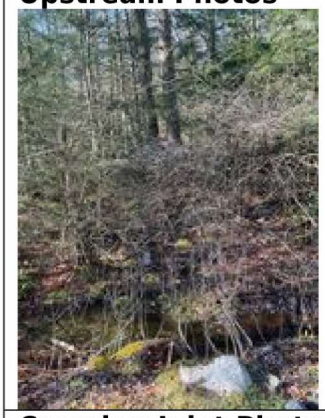
Photo Log

Road Photos





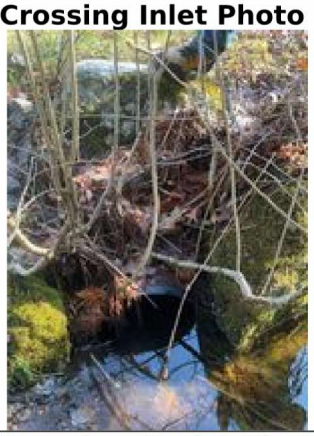
Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo









Crossing Outlet Photo



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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 15, 2024 9:55 AM

Culvert ID: Delisle-1	**Road name:** Delisle road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 19’ 6”	**Structure Length:** 55’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Multiple Culvert	**Crossing Condition:** OK
Flow Condition: Moderate	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 16’ 0” **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 2 **Observations:** Reservoir
Distance Between Culvert Barrels: 2’ 8”	

Crossing Inlet - Barrel 1- Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 6’ 0” **Inlet Height:** 6’ 0”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 0’ 0”
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** NA **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 4’ 0” **Water Depth:** 1’ 1”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:**

Crossing Inlet - Barrel 2- Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 6’ 0” **Inlet Height:** 5’ 11”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1’ 1”
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** NA **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 2’ 0” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Southampton Culvert Assessment Form

Tighe&Bond

Inlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: **Adequate** Cross-Section Deformation: ***Adequate***	Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Armoring: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***
Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:** Minor dent at bottom

Downstream Area	
Downstream Channel Bankfull Width: 18’ 0” 10' **Width Confidence:** Low/Estimated	**Number of Barrels:** 2 **Constriction:** Moderate
Tailwater Scour Pool: Small	
Distance Between Culvert Barrels: 3’ 3”	
Notes on Downstream:	

Crossing Outlet - Barrel 1 - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 5’ 11” **Outlet Height:** 6’ 1”
Crossing Dimensions			
Road Fill Height: 2’ 0”			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Poor **Headwall Condition:** NA	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 3’ 4” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 11”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Condition of Downstream Embankment: Poor		**Crossing Outlet Observations:**	
Severity Ranking			
Embankment Piping: Adequate			
Cross-section Deformation: Adequate			
Crossing Outlet - Barrel 2 - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 6’ 0” **Outlet Height:** 6’ 0”
Crossing Dimensions			
Road Fill Height: 2’ 0”			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Poor **Headwall Condition:** NA	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2’ 8” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”	

Southampton Culvert Assessment Form

Tighe&Bond

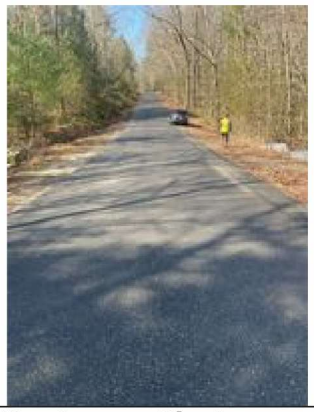
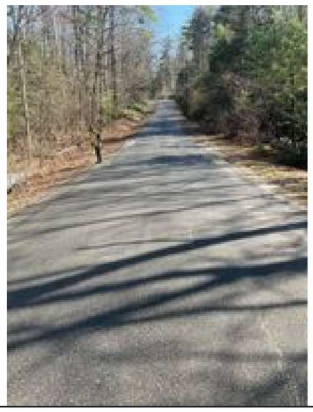
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***	Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***
Condition of Downstream Embankment: Poor	**Crossing Outlet Observations:**
Severity Ranking	
Embankment Piping: Adequate	
Cross-section Deformation: Adequate	

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: Yes	**Location:** Near Inlet	**Distance From Crossing:** 100’ 0”
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

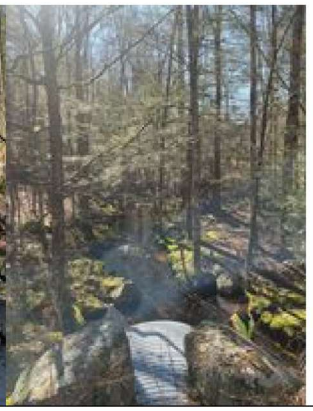
Field Recommendations: None replacement **Performance Problems Requiring Action:**	**Comments:** Should continue to monitor. The outlet is deteriorating and looks like a good candidate for natural stream bottom. Only water was passing through pipe 2, pipe 1 is higher elevation at invert and appears to be more deteriorated at outlet.

Photo Log

Road Photos

Upstream Photos

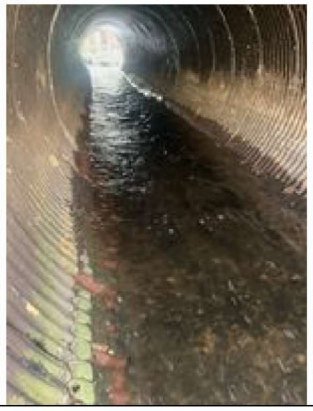
Downstream Embankment Photo




Crossing Inlet Photo




Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 21, 2024 8:13 AM

Culvert ID: Douglas-1	**Road name:** Douglas road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Critical
Pavement Width: 12’ 6”	**Structure Length:** 19’ 6”
Road Observations: Road is busier than expected in morning due to business at the end of the road.	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Moderate	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 2 **Observations:** No established bank, wetland
Distance Between Culvert Barrels: 0’ 6”	

Crossing Inlet - Barrel 1- Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1’ 6” **Inlet Height:** 1’ 6”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 0’ 0”
Inlet Type: Wingwalls **Headwall Material:** None **Wingwall Material:** Stone	**Embankment Condition:** Adequate **Headwall Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1’ 4” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Poor***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Poor***	Embankment Piping: ***Adequate***

Cross-section Deformation: Poor **Embankment Piping:** Adequate	**Inlet Observations:** Partially clogged, simple maintenance

Crossing Inlet - Barrel 2- Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1’ 6” **Inlet Height:** 1’ 5”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 0’ 0”
Inlet Type: Wingwalls **Headwall Material:** None **Wingwall Material:** Stone	**Embankment Condition:** Adequate **Headwall Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1’ 6” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Poor*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: **Adequate** Cross-Section Deformation: ***Poor***	Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Armoring: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***
Cross-section Deformation: Poor **Embankment Piping:** Adequate	**Inlet Observations:**

Downstream Area	
Downstream Channel Bankfull Width: 4’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 2 **Constriction:** Moderate
Tailwater Scour Pool: Small	
Distance Between Culvert Barrels: 0’ 6”	
Notes on Downstream:	

Crossing Outlet - Barrel 1 - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Cascade	**Outlet Width:** 1’ 6” **Outlet Height:** 1’ 6”
Crossing Dimensions			
Road Fill Height: 1’ 1”			
Headwall Material: None **Wingwall Material:** Stone		**Embankment Condition:** Critical **Headwall Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0’ 10” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** 0’ 0” **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 6”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Condition of Downstream Embankment: Critical		**Crossing Outlet Observations:**	
Severity Ranking			
Embankment Piping: Adequate			
Cross-section Deformation: Adequate			
Crossing Outlet - Barrel 2 - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Cascade	**Outlet Width:** 1’ 6” **Outlet Height:** 1’ 5”
Crossing Dimensions			
Road Fill Height: 1’ 2”			
Headwall Material: None **Wingwall Material:** Stone		**Embankment Condition:** Critical **Headwall Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0’ 8” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** 0’ 0” **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 3”	

Southampton Culvert Assessment Form

Tighe&Bond

Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***Poor***	Cross-Section Deformation: ***Poor*** Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***
Condition of Downstream Embankment: Critical	**Crossing Outlet Observations:**
Severity Ranking	
Embankment Piping: Adequate	
Cross-section Deformation: Poor	

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Not Appropriate	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Local Outlet Scour, Aggressive Abrasion/Corrosion/Chemical	**Comments:** Good Replacement project with other culvert Douglas-2.

Photo Log

Road Photos




Upstream Photos





Downstream Embankment Photo






Crossing Inlet Photo






Crossing Outlet Photo





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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 21, 2024 11:17 AM

Culvert ID: Douglas-2	**Road name:** Douglas Road	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Poor
Pavement Width: 14’ 6”	**Structure Length:** 31’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (>45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: No Flow	**Crossing Comments:** ~~Culvert inlet is not visible~~

Upstream Area

Approximate Bank full Width: 1’ 0” **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** No stream. Flow through buried Cmp, excavated along 15’ of stream

Crossing Inlet - Cannot Locate - Debris, Heavy Brush, Partial Collapse

Inlet Shape: round	**Inlet Grade:** at grade	**Inlet Width:** ’ ” 1'-3" **Inlet Height:** ’ ” 10"

Crossing Dimensions

Bend Mid-Crossing: NO	**Road Fill Height:** ’ ” 2'
Inlet Type: CMP **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Headwall Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** ’ ” **Water Depth:** ’ ”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: OK	Structural Integrity of Barrel: Unknown
Channel Alignment: OK	Joints and Seams: Unknown
Level of Blockage: poor	Footings: NA
Flared End Section: NA	Headwall/Wingwalls: poor
Invert Deterioration: Unknown	Armoring: NA
Buoyancy or Crushing: Unknown	Apron: NA
Cross-Section Deformation: Unknown	Embankment Piping: OK

Cross-section Deformation: **Embankment Piping:**	**Inlet Observations:**

Downstream Area

Downstream Channel Bankfull Width: 1’ 0” 3' **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate
Tailwater Scour Pool: Small	
Notes on Downstream: Outlet leads to wetlands	

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Clogged/collapsed/sub merged	**Outlet Width:** 1’ 0” **Outlet Height:** 0’ 9”
Crossing Dimensions			
Road Fill Height: 2’ 0”			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Poor **Headwall Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0’ 10” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** 0’ 0” **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***Adequate*** Level of Blockage: ***Poor*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Critical*** OK		Cross-Section Deformation: ***Critical*** OK Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Condition of Downstream Embankment: Poor		**Crossing Outlet Observations:** ~~Outlet is completely submerged and corroded.~~	
Severity Ranking			
Embankment Piping: Unknown			
Cross-section Deformation: Critical			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 50%	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: Debris/Sediment/Rock, Deformation	**Physical Barrier Severity:** ~~Severe~~ poor	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Sediment Blockage > 1/2 the opening, Channel Degradation/Headcut, Embankment Slope Instability, Aggressive Abrasion/Corrosion/Chemical, ~~Buoyancy or Crushing-Related Inlet Failure~~, ~~No Access/Ends Totally Buried/Submerged~~	**Comments:** Should be replaced at some point but lower priority. DPW type project. Can be done with other culvert down the road (douglas-1). 1" irrigation line goes through the pipe

Photo Log

Road Photos





Upstream Photos






Downstream Embankment Photo





Crossing Inlet Photo

Crossing Outlet Photo





Inlet







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 29, 2024 10:43 AM

Culvert ID: East-2	**Road name:** East st	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate poor
Pavement Width: 22’ 0”	**Structure Length:** 50’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2’ 0” **Inlet Height:** 2’ 0”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 5’ 5”
Inlet Type: Projecting, Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Poor **Headwall Condition:** NA **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1’ 4” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Poor***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Poor***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:** Plastic flared end is separated from steel corrugated pipe

Downstream Area

Downstream Channel Bankfull Width: 9’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream:	

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

Structure Material: Rock/Stone	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 2’ 0” **Outlet Height:** 2’ 0”
Crossing Dimensions			
Road Fill Height: 7’ 0”			
Headwall Material: Stone **Wingwall Material:** Stone		**Embankment Condition:** Adequate **Headwall Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 1’ 8” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***Critical*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Condition of Downstream Embankment: Adequate		**Crossing Outlet Observations:** Steel flared end has eroded and several feet downstream. No more flared end	
Severity Ranking			
Embankment Piping: Adequate			
Cross-section Deformation: Adequate			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:**	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Maintenance **Performance Problems Requiring Action:**	**Comments:** Little substrate along bottom Pipe looks like it is in okay condition. However, this is a good candidate for MVP funding. Could use a box culvert. 8' steel gas main marked out on road. Hydrant is nearby. there is a lot of fill built up along the roadway shoulders under guardrails. Poor road drainage.

Could be a potential replacement project

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo



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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 29, 2024 12:26 PM

Culvert ID: East-3	**Road name:** East St	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23’ 0”	**Structure Length:** 3’ 7”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetlands

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1’ 4” **Inlet Height:** 1’ 0”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 4’ 4”
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** NA **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1’ 4” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Unknown***
Channel Alignment: ***Adequate***	Joints and Seams: ***Unknown***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Unknown***	Embankment Piping: ***Adequate***

Cross-section Deformation: Unknown **Embankment Piping:** Adequate	**Inlet Observations:** Difficult to see due to high water level

Downstream Area

Downstream Channel Bankfull Width: 0’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Wetlands	

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** ~~Clogged/collapsed/submerged~~	**Outlet Width:** 1’ 6” **Outlet Height:** 0’ 7”

Crossing Dimensions

Road Fill Height: 3’ 4”

Headwall Material: None **Wingwall Material:** None	**Embankment Condition:** ~~Critical~~ repaired using riprap **Headwall Condition:** NA
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1’ 6” **Water Depth:** 1’ 1”	**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** OK Channel Alignment: ***Adequate*** Level of Blockage: ***Unknown*** OK Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** poor Buoyancy or Crushing: ***Unknown*** OK	Cross-Section Deformation: ***Unknown*** OK Structural Integrity of Barrel: ***Unknown*** OK Joints and Seams: ***Unknown*** OK Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown*** OK
Condition of Downstream Embankment: ~~Critical~~ Riprap placed at embankment roadway	**Crossing Outlet Observations:** ~~Completely submerged and difficult to field measure width~~

Severity Ranking

Embankment Piping: Unknown

Cross-section Deformation: Unknown

Operation and Maintenance Concerns

Potential Illicit Discharged Observed: No	**Location:**
Notes on Illicit Discharge Evidence:	

Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** No - Deeper **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** No Access/Ends Totally Buried/Submerged	**Comments:** Could use headwall and guardrail improvements. Might be a water main crossing here. Can be a simple HDPE replacement







Outlet appears to be below grade partially buried in sediment.

Photo Log

Road Photos



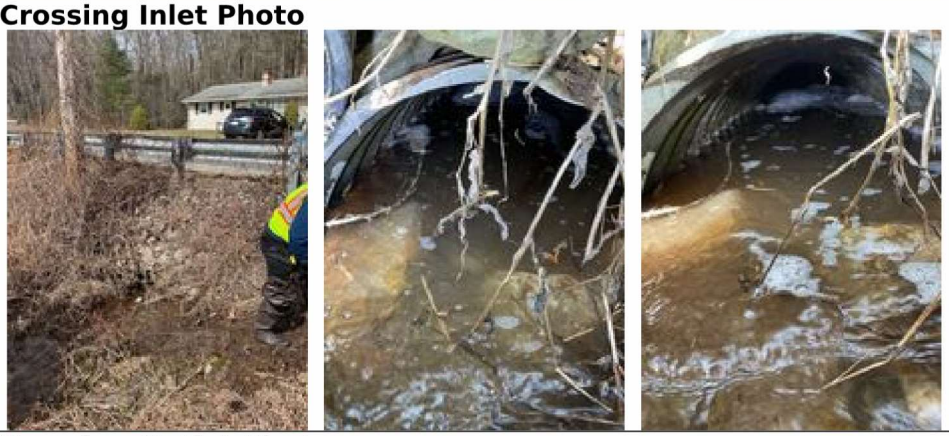
Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo



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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 29, 2024 1:30 PM

Culvert ID: East-4	**Road name:** East st	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23’ 0”	**Structure Length:** 43’ 0”
Road Observations: Guardrail bent towards head wall at inlet	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 12’ 0” **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Inlet Drop	**Inlet Width:** 5’ 8” **Inlet Height:** 5’ 10”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 8’ 8”
Inlet Type: Headwall & Wingwalls **Headwall Material:** Concrete **Wingwall Material:** Concrete	**Embankment Condition:** Adequate **Headwall Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 2’ 8” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:**

Downstream Area

Downstream Channel Bankfull Width: 16’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Large	
Notes on Downstream:	

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Cascade	**Outlet Width:** 5’ 8” **Outlet Height:** 5’ 10”
Crossing Dimensions			
Road Fill Height: 10’ 0”			
Headwall Material: Concrete **Wingwall Material:** Concrete		**Embankment Condition:** Adequate **Headwall Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2’ 8” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 1’ 0”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Critical*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Condition of Downstream Embankment: Adequate		**Crossing Outlet Observations:**	
Severity Ranking			
Embankment Piping: Adequate			
Cross-section Deformation: Adequate			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:**	**Comments:** Headwall/wingwall repairs. Pipe is in okay condition. replacement would be a large project (very steep embankments) with tough road geometry.

Photo Log

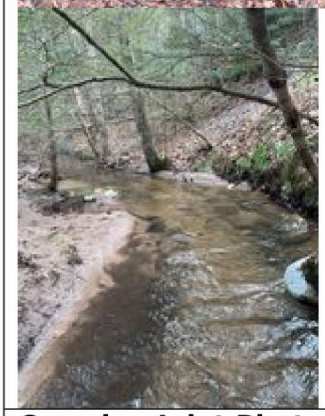
Road Photos






Upstream Photos





Downstream Embankment Photo





Crossing Inlet Photo






Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 16, 2024 8:05 AM

Culvert ID: Gilbert-3	**Road name:** Gilbert Rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 25’ 6”	**Structure Length:** 44’ 0”
Road Observations: Embankment erosion at inlet	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Inlet crushed and deformed with blockage from rupture of pipe

Upstream Area

Approximate Bank full Width: 0’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** 30” concrete pipe upstream just 12 feet from inlet. Bank full width unknown and therefore shown as zero

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2’ 5” **Inlet Height:** 1’ 10”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3’ 3”	
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Critical **Headwall Condition:** NA **Armoring/Riprap Condition:** NA	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 2’ 5” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Critical***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Poor***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Critical***	Armoring: ***NA***
Buoyancy or Crushing: **Critical**	Apron: ***NA***
Cross-Section Deformation: ***Critical***	Embankment Piping: ***Adequate***

Cross-section Deformation: Critical **Embankment Piping:** Adequate	**Inlet Observations:** Crushed, deteriorated inlet with pieces of culvert obstructing passage

Downstream Area

Downstream Channel Bankfull Width: 0’ 0” 4' **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream:	

Southampton Culvert Assessment Form

Tighe&Bond

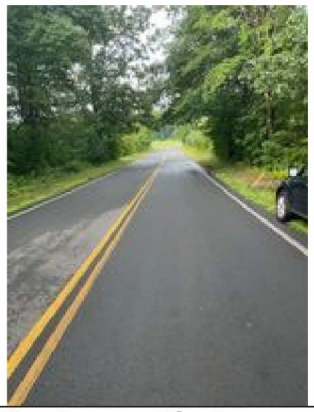
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 2’ 4” **Outlet Height:** 2’ 3”
Crossing Dimensions			
Road Fill Height: 2’ 8”			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate **Headwall Condition:** NA	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 2’ 4” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Poor*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Condition of Downstream Embankment: Adequate		**Crossing Outlet Observations:** Barbed wire at outlet	
Severity Ranking			
Embankment Piping: Adequate			
Cross-section Deformation: Adequate			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Deformation, Fencing	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Aggressive Abrasion/Corrosion/Chemical, Buoyancy or Crushing-Related Inltet Failure	**Comments:** Seems like a good candidate for top 5 culvert replacement. Suggest combining with Gilbert-4 Needs headwall and guardrail. Might be close on openness ratio and may need PCN. Appears to overtop inlet and run down road. Need to evaluate H&H

Photo Log

Road Photos



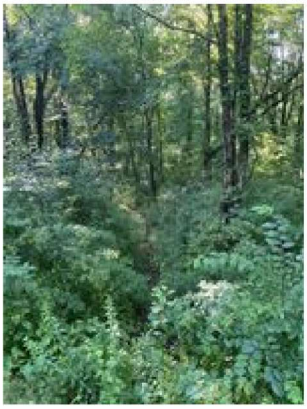


Upstream Photos



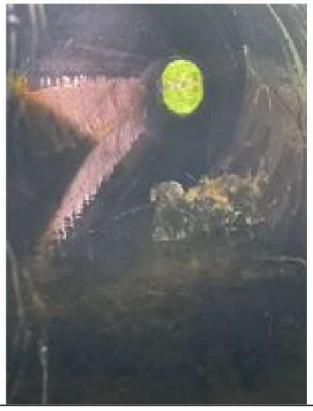



Downstream Embankment Photo

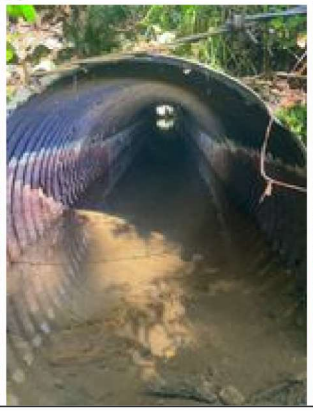
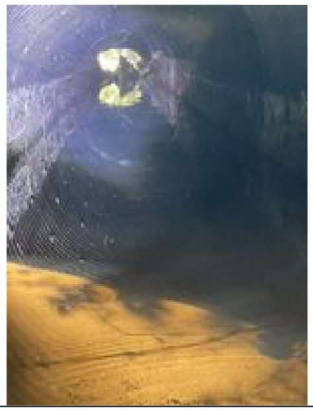



Crossing Inlet Photo



Crossing Outlet Photo

Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 16, 2024 9:00 AM

Culvert ID: Gilbert-4	**Road name:** Gilbert RD	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 25’ 0”	**Structure Length:** 46’ 0”
Road Observations: Small crack developing over culvert across roadway pavement	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Outlet submerged. Inlet flared end deteriorated

Upstream Area

Approximate Bank full Width: 0’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Heavy vegetation unable to verify bank full width

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1’ 4” **Inlet Height:** 1’ 4”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1’ 1”
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** NA **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1’ 3” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Poor***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:** Could not see through full length of pipe. Outlet submerged

Downstream Area

Downstream Channel Bankfull Width: 0’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Heavy vegetation into flood zone. Barbed wire at outlet	

Crossing Outlet - Cannot Locate - Heavy Brush, High water

Southampton Culvert Assessment Form

Tighe&Bond

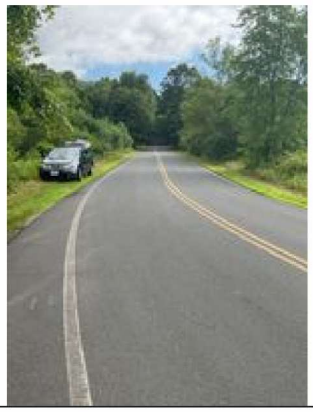
Structure Material:	**Outlet Shape:**	**Outlet Grade:**	**Outlet Width:** ' " **Outlet Height:** ' "
Crossing Dimensions			
Road Fill Height: ' "			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** **Headwall Condition:**	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** ' " **Water Depth:** ' "		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ' " **Outlet Drop to Stream Bottom:** ' "	
Outlet Condition: Structural (Longitudinal) Alignment: Channel Alignment: Level of Blockage: Flared End Section: Invert Deterioration: Buoyancy or Crushing:		Cross-Section Deformation: Structural Integrity of Barrel: Joints and Seams: Footings: Headwall/Wingwalls: Apron: Embankment Piping:	
Condition of Downstream Embankment:		**Crossing Outlet Observations:**	
Severity Ranking			
Embankment Piping:			
Cross-section Deformation:			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ' "
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 25%	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Fencing	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

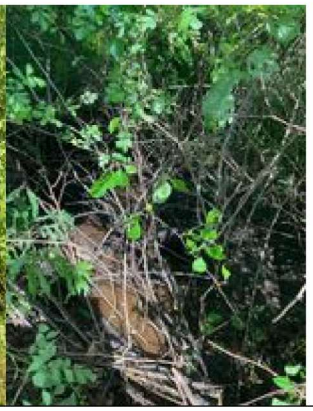
Field Recommendations: Maintenance **Performance Problems Requiring Action:** No Access/Ends Totally Buried/Submerged	**Comments:** Nearby stream is likely cause of flooding. Unlikely to make a significant difference in flood conditions by replacing. Channel and surrounding area is flat. Would need to raise the road but we are in a floodplain. Shallow small diameter. Seems likely an emergency repair or DPW local project. Road is in good condition. Lower priority. Flooding is the bigger issue.

Photo Log

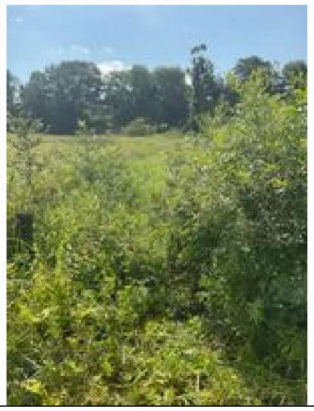
Road Photos


Upstream Photos

Downstream Embankment Photo

Crossing Inlet Photo





Crossing Outlet Photo

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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 9, 2024 3:50 PM

Culvert ID: Maple-3	**Road name:** Maple st	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 24’ 0”	**Structure Length:** 44’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low dry	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 12’ 0” **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1’ 3” **Inlet Height:** 1’ 3”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 2’ 2”
Inlet Type: Projecting, Other **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** NA **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0’ 9” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:**

Downstream Area

Downstream Channel Bankfull Width: 0’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream: Wetland area and private property. Bankfull could not be measured	

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1’ 1” **Outlet Height:** 0’ 10”
Crossing Dimensions			
Road Fill Height: 2’ 8”			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Poor **Headwall Condition:** NA	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1’ 1” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** OK Channel Alignment: ***Adequate*** Level of Blockage: ***Poor*** OK Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Critical Buoyancy or Crushing: ***Unknown*** OK		Cross-Section Deformation: ***Unknown*** OK Structural Integrity of Barrel: ***Unknown*** OK Joints and Seams: ***Unknown*** OK Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown*** OK	
Condition of Downstream Embankment: Poor		**Crossing Outlet Observations:** ~~Much could not be verified due to high water elevation in pipe~~.	
Severity Ranking			
Embankment Piping: Unknown			
Cross-section Deformation: Unknown			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** ~~50%~~ 25%	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** ~~Sediment Blockage > 1/2 the opening~~	**Comments:** Sediment blockage minor at outlet. Dry at time of inspection. Culvert was in OK condition

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo





Crossing Outlet Photo











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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 18, 2024 2:07 PM

Culvert ID: Middle-2	**Road name:** Middle Rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 22’ 0”	**Structure Length:** 110’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Severe deterioration at inlet and denting of outlet with minor deterioration. Headwall unstable at inlet.

Upstream Area

Approximate Bank full Width: 10’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2’ 6” **Inlet Height:** 2’ 6”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 6’ 6”
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** Critical **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1’ 10” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Critical***
Invert Deterioration: ***Poor***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:**

Downstream Area

Downstream Channel Bankfull Width: 4’ 6” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Small	
Notes on Downstream:	

Southampton Culvert Assessment Form

Tighe&Bond

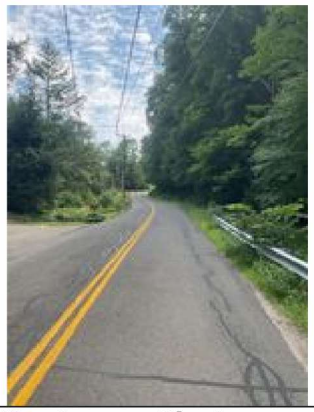
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 3’ 1” **Outlet Height:** 2’ 11”
Crossing Dimensions			
Road Fill Height: 10’ 0”			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate **Headwall Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1’ 2” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 5”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Critical*** Buoyancy or Crushing: ***NA***		Cross-Section Deformation: ***Poor*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Condition of Downstream Embankment: Adequate		**Crossing Outlet Observations:** Some denting of top of metal pipe	
Severity Ranking			
Embankment Piping: Adequate			
Cross-section Deformation: Poor			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:**	**Comments:** Replacement would be expensive (steep slopes and long) Significant section loss at inlet above water line (first 10-15 feet) before approaching roadway

Photo Log

Road Photos



Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



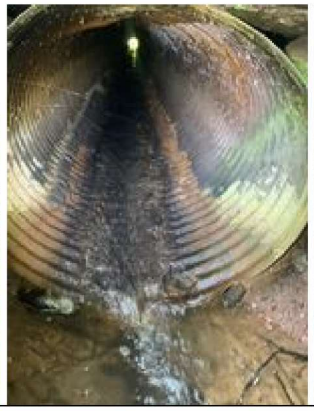


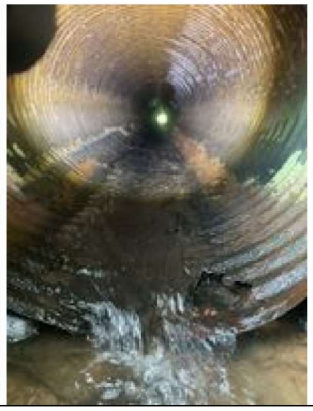


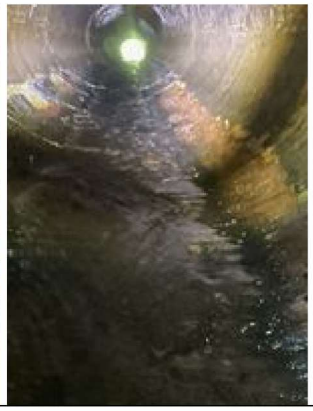


Crossing Outlet Photo









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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 18, 2024 11:33 AM

Culvert ID: Miller-1	**Road name:** Miller Ave	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Critical
Pavement Width: 25’ 0”	**Structure Length:** 43’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low no flow	**Crossing Comments:** Outlet submerged. Inlet greater than half full.

Upstream Area

Approximate Bank full Width: 6’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1’ 6” **Inlet Height:** 1’ 4”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1’ 1”
Inlet Type: Projecting **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** Critical poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1’ 6” **Water Depth:** 1’ 1”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***
Channel Alignment: ***Adequate***
Level of Blockage: ***Adequate***
Flared End Section: ***NA***
Invert Deterioration: ***Critical***
Buoyancy or Crushing: **Adequate**
Cross-Section Deformation: ***Adequate***

Structural Integrity of Barrel: ***Critical***
Joints and Seams: ***Adequate***
Footings: ***NA***
Headwall/Wingwalls: ***Critical***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:** Blockage was removed.

Downstream Area

Downstream Channel Bankfull Width: 7’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Large	
Notes on Downstream:	

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** ~~Clogged/collapsed/submerged~~	**Outlet Width:** 0’ 0” 1'-6" **Outlet Height:** 0’ 0” 10"
Crossing Dimensions			
Road Fill Height: 0’ 0” 3'			
Headwall Material: None Stone **Wingwall Material:** None		**Embankment Condition:** Adequate **Headwall Condition:** NA poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0’ 0” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** ok Channel Alignment: ***Unknown*** ok Level of Blockage: ***Unknown*** ok Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Sediment in way Buoyancy or Crushing: ***Unknown*** ok		Cross-Section Deformation: ***Unknown*** ok Structural Integrity of Barrel: ***Unknown*** ok Joints and Seams: ***Unknown*** ok Footings: ***NA*** Headwall/Wingwalls: ***NA*** poor, settlement of wall, large gaps in stones Apron: ***NA*** Embankment Piping: ***Unknown*** ok	
Condition of Downstream Embankment: Adequate		**Crossing Outlet Observations:** ~~Outlet is likely crushed and submerged.~~ blockage	
Severity Ranking			
Embankment Piping: Unknown			
Cross-section Deformation: Unknown			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** 25% average	**Water Depth Matches Stream:** No - Deeper **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Other	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Local Outlet Scour, Aggressive Abrasion/Corrosion/Chemical, ~~No Access/Ends Totally Buried/Submerged~~	**Comments:** Seems like an easy DPW HDPE replacement

Southampton Culvert Assessment Form

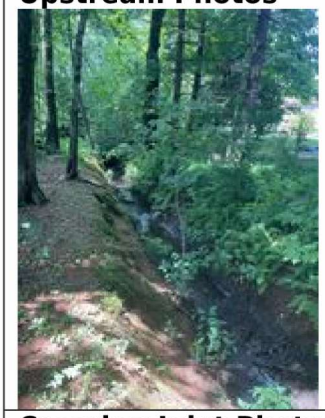
Tighe&Bond

Photo Log

Road Photos



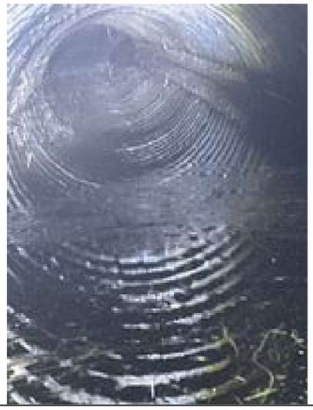

Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo


Crossing Outlet Photo






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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 26, 2024 11:26 AM

Culvert ID: Pleasant-2	**Road name:** Pleasant St.	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21’ 3”	**Structure Length:** 49’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0’ 0” **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Wetlands

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1’ 4” **Inlet Height:** 1’ 4”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 6’ 6”
Inlet Type: Mitered to Slope **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** NA **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0’ 10” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:**

Downstream Area

Downstream Channel Bankfull Width: 12’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate

Tailwater Scour Pool: None

Notes on Downstream:
Small circular drainage pipe also leads into downstream. Very low flow, 1’ diameter. Inlet unknown

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

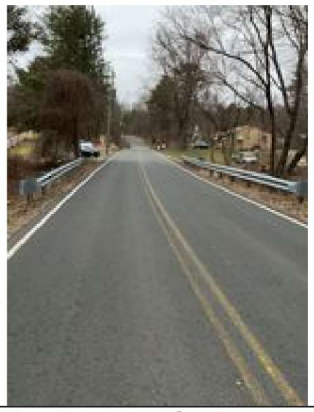
Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall onto cascade	**Outlet Width:** 1’ 4” **Outlet Height:** 1’ 4”
Crossing Dimensions			
Road Fill Height: 10’ 0”			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate **Headwall Condition:** NA	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0’ 10” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 3’ 3” **Outlet Drop to Stream Bottom:** 3’ 4”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Poor*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***Poor*** Footings: ***Unknown*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Condition of Downstream Embankment: Adequate		**Crossing Outlet Observations:** Revetments above pipe	
Severity Ranking			
Embankment Piping: Adequate			
Cross-section Deformation: Adequate			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** No - Faster
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:** Looks okay. Road is newer. No concerns

Photo Log

Road Photos






Upstream Photos





Downstream Embankment Photo

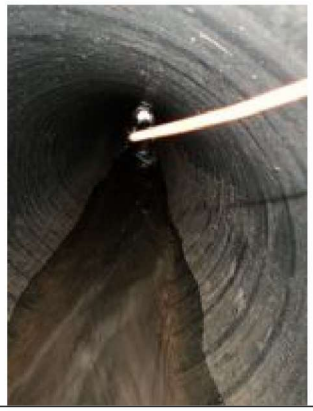






Crossing Inlet Photo





Crossing Outlet Photo






Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 11:06 AM

Culvert ID: Pleasant-7	**Road name:** Pleasant street	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 21’ 0”	**Structure Length:** 41’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low dry	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 0’ 0” **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Perched	**Inlet Width:** 1’ 0” **Inlet Height:** 1’ 0”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 5’ 5”
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Poor **Headwall Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 0’ 9” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Unknown***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Unknown***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:**

Downstream Area

Downstream Channel Bankfull Width: 0’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate
Tailwater Scour Pool: None	
Notes on Downstream: Wetlands into pond	

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** ~~Clogged/collapsed/submerged~~	**Outlet Width:** 1’ 0” **Outlet Height:** 0’ 6”
Crossing Dimensions			
Road Fill Height: 6’ 7”			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** Adequate **Headwall Condition:** NA	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 1’ 0” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** Channel Alignment: ***NA*** Level of Blockage: ***Unknown*** Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***		Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***NA*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Condition of Downstream Embankment: Adequate		**Crossing Outlet Observations:** ~~Completely submerged~~	
Severity Ranking			
Embankment Piping: Unknown			
Cross-section Deformation: Unknown			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** 50%	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** No - Slower
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Sediment Blockage > 1/2 the opening, No ~~Access/Ends Totally Buried/Submerged~~	**Comments:** Could use riprap on both sides. No signs of immediate failure. Can be good candidate replacement along with the other culvert Pleasant-8 just beside this one.

Sediment buildup prevents proper inspection of pipe.

may be better off with replacement.

Photo Log

Road Photos






Upstream Photos





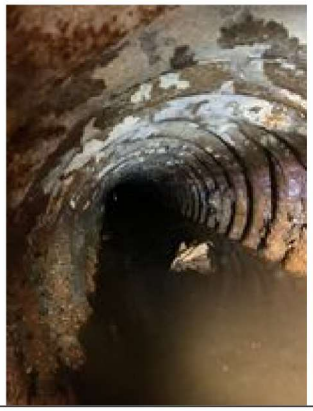
Downstream Embankment Photo





Crossing Inlet Photo






Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 2, 2024 1:42 PM

Culvert ID: Pleasant-11	**Road name:** Pleasant street	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 23’ 0”	**Structure Length:** 80’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	One Side		Adequate

Crossing Alignment to Roadway: Skewed (>45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 12’ 0” **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2’ 0” **Inlet Height:** 2’ 0”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3’ 3”
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** NA **Armoring/Riprap Condition:** Adequate

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1’ 0” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***Adequate***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:**

Downstream Area

Downstream Channel Bankfull Width: 8’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: Large	
Notes on Downstream: Streams leads to private drive way culvert	

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

Structure Material: Plastic	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 2’ 0” **Outlet Height:** 2’ 0”
Crossing Dimensions			
Road Fill Height: 6’ 0”			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate **Headwall Condition:** Adequate	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0’ 11” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 2’ 2” **Outlet Drop to Stream Bottom:** 3’ 2”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Poor*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Adequate*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Condition of Downstream Embankment: Adequate		**Crossing Outlet Observations:**	
Severity Ranking			
Embankment Piping: Adequate			
Cross-section Deformation: Adequate			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Shallower **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:** Looks like the bell end of the HDPE pipe got cut and pushed into pipe. It does not seem much work is needed here.

Photo Log

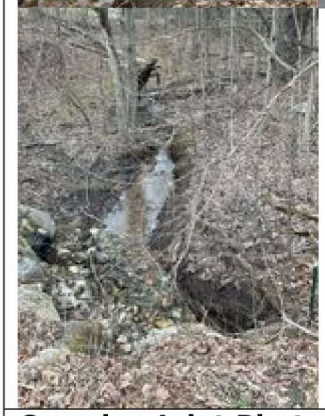
Road Photos





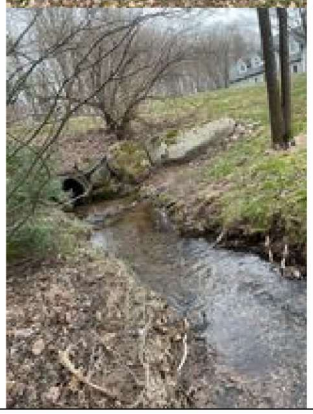
Upstream Photos





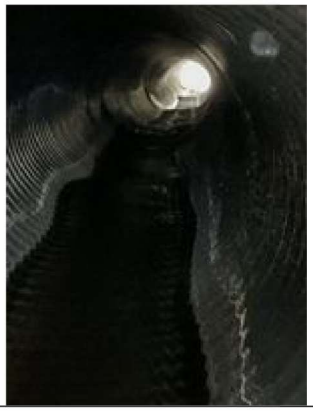
Downstream Embankment Photo





Crossing Inlet Photo

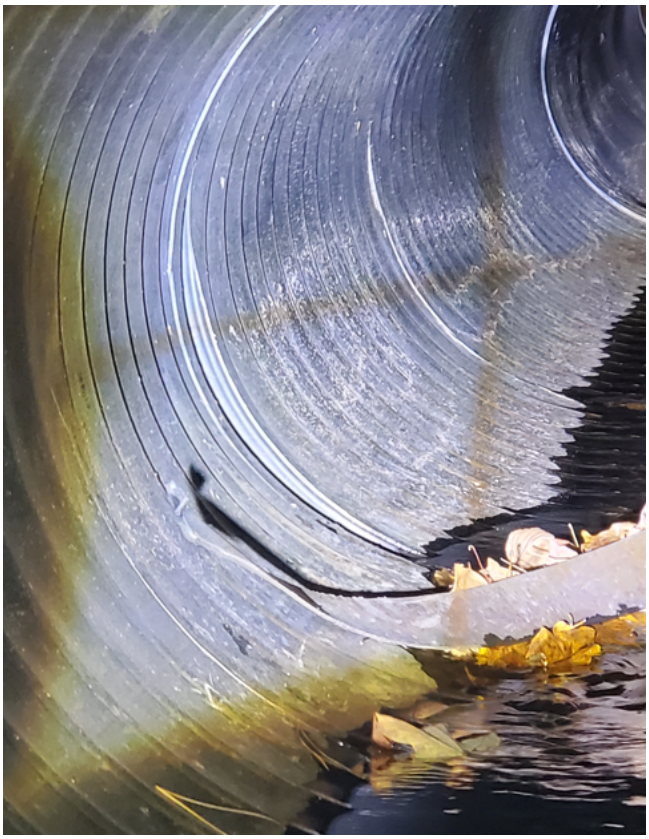


Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 29, 2024 9:46 AM

Culvert ID: Railroad-3	**Road name:** rail trail	**Stream:**
Weather: Cloudy		

Roadway Information

Road Type: Trail	**Condition:** Adequate
Pavement Width: 0’ 0”	**Structure Length:** 125’ 0”
Road Observations: Old railway	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:** Open bottom stone 3 sided culvert. Stones span width and supported by stone walls

Upstream Area

Approximate Bank full Width: 10’ 0” **Width Confidence:** Low/Estimated **Constriction:** Moderate	**Number of Barrels:** 1 **Observations:** Erosion of many embankments and major meandoring of stream

Crossing Inlet - Located -

Inlet Shape: 6 - Box/Bridge with Abutments	**Inlet Grade:** At Stream Grade	**Inlet Width:** 3’ 6” **Inlet Height:** 5’ 0”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 30’ 30”
Inlet Type: Headwall & Wingwalls **Headwall Material:** Stone **Wingwall Material:** Stone	**Embankment Condition:** Poor **Headwall Condition:** Critical **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 3’ 6” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** Yes

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***NA***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Critical***
Invert Deterioration: ***NA***	Armoring: ***NA***
Buoyancy or Crushing: **NA**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Poor***

Cross-section Deformation: Adequate **Embankment Piping:** Poor	**Inlet Observations:** Stones from head wall have fallen into stream. One other is close to falling. Wingwall unstable

Downstream Area

Downstream Channel Bankfull Width: 16’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream:	

Southampton Culvert Assessment Form

Tighe&Bond

Crossing Outlet - Located -			
Structure Material: Rock/Stone	**Outlet Shape:** 6 - Box/Bridge with Abutments	**Outlet Grade:** At stream grade	**Outlet Width:** 3’ 6” **Outlet Height:** 4’ 10”
Crossing Dimensions			
Road Fill Height: 32’ 0”			
Headwall Material: Stone **Wingwall Material:** Stone		**Embankment Condition:** Adequate **Headwall Condition:**	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 3’ 6” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***NA*** Buoyancy or Crushing: ***NA***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***NA*** Footings: ***NA*** Headwall/Wingwalls: Apron: ***NA*** Embankment Piping: ***Adequate***	
Condition of Downstream Embankment: Adequate		**Crossing Outlet Observations:**	
Severity Ranking			
Embankment Piping: Adequate			
Cross-section Deformation: Adequate			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Embankment Piping	**Comments:** reset headwall blocks. MassDOT repair. Fix slope failures

Photo Log

Road Photos




Upstream Photos





Downstream Embankment Photo





Crossing Inlet Photo







Crossing Outlet Photo






Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 9:04 AM

Culvert ID: Riverdale-1	**Road name:** Riverdale rd	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved newly paved	**Condition:** Adequate
Pavement Width: 20’ 0”	**Structure Length:** 31’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Skewed (>45)
Crossing Type: Culvert	**Crossing Condition:** OK
Flow Condition: Typical-Low	**Crossing Comments:** Two streams from opposite side or single stream that parts.

Upstream Area

Approximate Bank full Width: 11’ 0” 8' **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetland area on north stream side but similar channel bank full width

Crossing Inlet - Located -

Inlet Shape: 2 - Pipe Arch/Elliptical Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 5’ 0” **Inlet Height:** 2’ 0”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 3’ 3”
Inlet Type: Headwall, Mitered to Slope **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Poor **Headwall Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 5’ 0” **Water Depth:** 1’ 1”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Critical***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***NA***	Armoring: ***NA***
Buoyancy or Crushing: **Poor**	Apron: ***NA***
Cross-Section Deformation: ***Poor***	Embankment Piping: ***Adequate***

Cross-section Deformation: Poor **Embankment Piping:** Adequate	**Inlet Observations:** Large stone at headwalls bending top of culvert

Downstream Area

Downstream Channel Bankfull Width: 0’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate
Tailwater Scour Pool: None	
Notes on Downstream: River downstream. Muddy could not access outlet hands on	

Southampton Culvert Assessment Form

Tighe&Bond

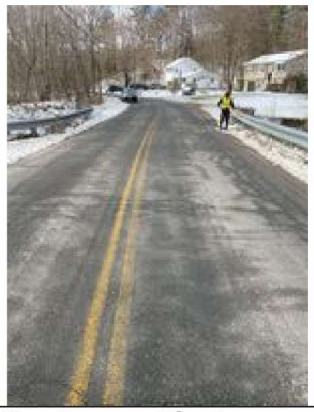
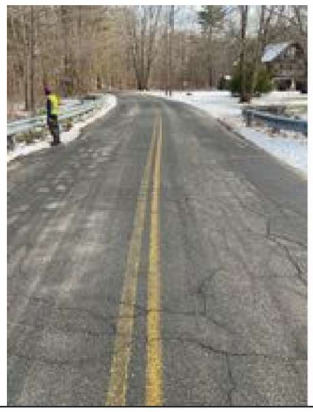
Crossing Outlet - Located -			
Structure Material: Metal	**Outlet Shape:** 2 - Pipe Arch/Elliptical Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 5’ 0” **Outlet Height:** 2’ 6”
Crossing Dimensions			
Road Fill Height: 4’ 2”			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate **Headwall Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 5’ 0” **Water Depth:** 1’ 1”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***NA*** Buoyancy or Crushing: ***Poor***		Cross-Section Deformation: ***Poor*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Adequate*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Adequate***	
Condition of Downstream Embankment: Adequate		**Crossing Outlet Observations:** Could not access from stream. Dimensions confirmed from embankments	
Severity Ranking			
Embankment Piping: Adequate			
Cross-section Deformation: Poor			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

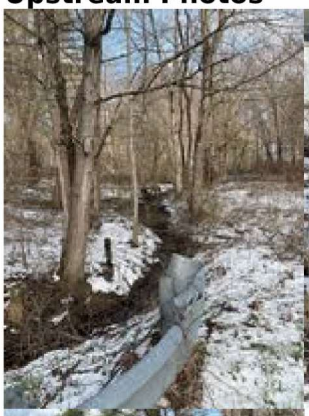
Field Recommendations: None **Performance Problems Requiring Action:**	**Comments:** Stone headwalls have settled and are crushing the top of the pipe at both sides. Appear to be unstable. In event of storm, may block part of inlet/outlet and erosion of the embankment and part of roadway is likely. Replacement of headwall/wingwalls with concrete is recommended

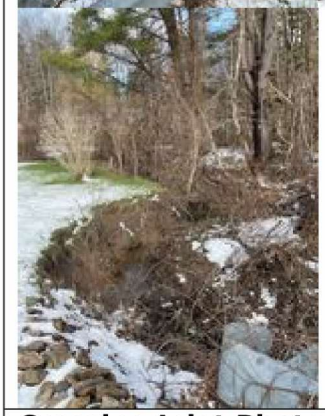
Photo Log

Road Photos

Upstream Photos

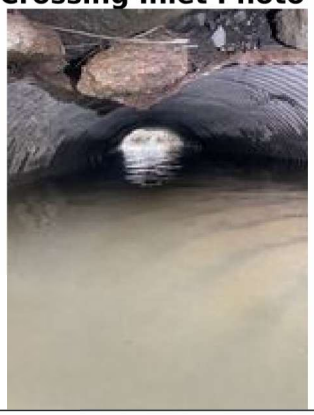
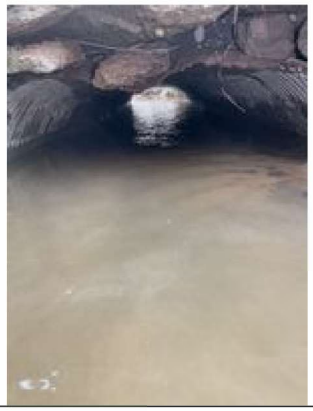




Downstream Embankment Photo



Crossing Inlet Photo

Crossing Outlet Photo



Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 5, 2024 8:39 AM

Culvert ID: Riverdale-2	**Road name:** Riverdale rd	**Stream:**
Weather: Partly Cloudy		

Roadway Information

Road Type: Paved newly paved	**Condition:** Poor
Pavement Width: 20’ 0”	**Structure Length:** 49’ 0”

Road Observations:

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Unknown
Flow Condition: Typical-Low	**Crossing Comments:**

Upstream Area

Approximate Bank full Width: 5’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Lots of vegetation

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1’ 0” **Inlet Height:** 1’ 0”

Crossing Dimensions

Bend Mid-Crossing: None Yes <45Deg	**Road Fill Height:** 5’ 5”
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: Yes **Scour Location:** Culvert **Scour Damage:** Small	**Substrate/Water Width:** 1’ 0” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Unknown***
Channel Alignment: ***Adequate***
Level of Blockage: ***Adequate***
Flared End Section: ***NA***
Invert Deterioration: ***Unknown***
Buoyancy or Crushing: **Adequate**
Cross-Section Deformation: ***Adequate***

Structural Integrity of Barrel: ***Adequate***
Joints and Seams: ***NA***
Footings: ***NA***
Headwall/Wingwalls: ***Poor***
Armoring: ***NA***
Apron: ***NA***
Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:** Plastic inlet pipe

Downstream Area

Downstream Channel Bankfull Width: 0’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: None

Notes on Downstream:
River 30 ft downstream

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 1’ 4” **Outlet Height:** 0’ 10”
Crossing Dimensions			
Road Fill Height: 5’ 6”			
Headwall Material: Stone **Wingwall Material:** None		**Embankment Condition:** Adequate **Headwall Condition:** Poor	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0’ 11” **Water Depth:** 0’ 0” 6"		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Adequate*** Channel Alignment: ***Adequate*** Level of Blockage: ***Poor*** Adequate Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Buoyancy or Crushing: ***Unknown***		Cross-Section Deformation: ***Unknown*** Structural Integrity of Barrel: ***Unknown*** Joints and Seams: ***Unknown*** Footings: ***NA*** Headwall/Wingwalls: ***Poor*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Condition of Downstream Embankment: Adequate		**Crossing Outlet Observations:** Submerged	
Severity Ranking			
Embankment Piping: Unknown			
Cross-section Deformation: Unknown			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Silt **Structure Substrate Coverage:** 50%	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

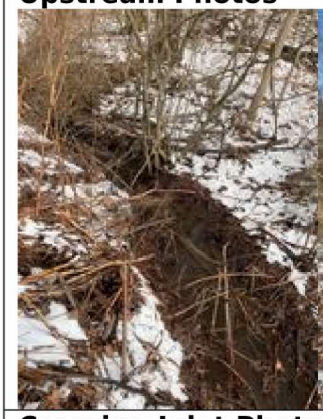
Field Recommendations: None **Performance Problems Requiring Action:** No Access/Ends Totally Buried/Submerged	**Comments:** transitions from HDPE to CMP, about 10-15 ft of HDPE pipe at inlet. Sediment blockage at outlet about 25%-height. Could not inspect invert

Photo Log

Road Photos




Upstream Photos




Downstream Embankment Photo




Crossing Inlet Photo






Crossing Outlet Photo







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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond July 19, 2024 7:33 AM

Culvert ID: TownHall-1	**Road name:** Maple St	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Driveway	**Condition:** Critical
Pavement Width: 0’ 0”	**Structure Length:** 430’ 0”

Road Observations: Town Hall. Erosion on edge of pavement. lots of cracking. Concerns entire parking lot, not just driveway.

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: Unknown	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low	**Crossing Comments:** Structural failure at outlet/headwall. No catch basins between inlet and outlet. Culvert assumed continuous along full length.

Upstream Area

Approximate Bank full Width: 4’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** Inlet Drop	**Inlet Width:** 2’ 4” **Inlet Height:** 2’ 4”

Crossing Dimensions

Bend Mid-Crossing: Skewed (>45)	**Road Fill Height:** 2’ 2”
Inlet Type: Projecting, Headwall **Headwall Material:** Concrete **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** Adequate **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 0’ 4” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Critical***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Adequate***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:** Fence above concrete headwall. Build up debris and sediment acting as blockage exceeding half of the opening. Water is getting through, seeping through sides under normal flow conditions.

Downstream Area

Downstream Channel Bankfull Width: 5’ 6” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe

Tailwater Scour Pool: Small
Notes on Downstream:

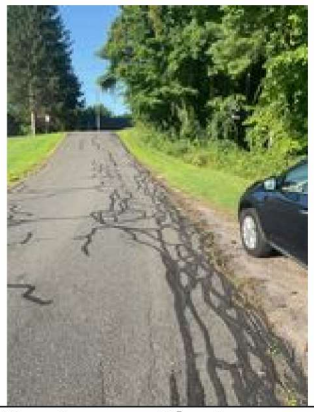
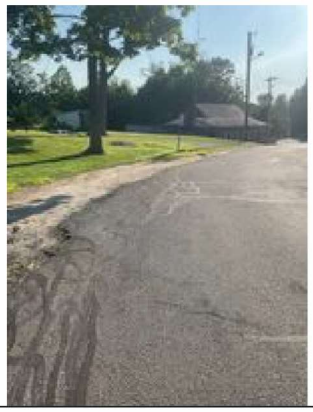
Crossing Outlet - Located -			
Structure Material: Concrete	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** Free fall	**Outlet Width:** 2’ 6” **Outlet Height:** 2’ 6”
Crossing Dimensions			
Road Fill Height: 12’ 0”			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:** Critical **Headwall Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: Yes **Substrate/Water Width:** 0’ 7” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 3’ 3” **Outlet Drop to Stream Bottom:** 3’ 8”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Critical*** Channel Alignment: ***Adequate*** Level of Blockage: ***Adequate*** Flared End Section: ***NA*** Invert Deterioration: ***Adequate*** Buoyancy or Crushing: ***Adequate***		Cross-Section Deformation: ***Adequate*** Structural Integrity of Barrel: ***Adequate*** Joints and Seams: ***Critical*** Footings: ***NA*** Headwall/Wingwalls: ***Critical*** Apron: ***NA*** Embankment Piping: ***Poor***	
Condition of Downstream Embankment: Critical		**Crossing Outlet Observations:** Bottom of headwall eroded due to scour pool. Pipe/headwall leaning forward 4-6 inches. Vertical misalignment approximately 5 inches. Seem displacement along last 2 pre cast units.	
Severity Ranking			
Embankment Piping: Poor			
Cross-section Deformation: Adequate			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: None	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Rehabilitation **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Local Outlet Scour, Embankment Slope Instability, Embankment Piping	**Comments:** Relay last sections of pipe. Embankment slope instability. recast headwall. Failure should not effect driveway/firestation in short term

Photo Log

Road Photos

Upstream Photos

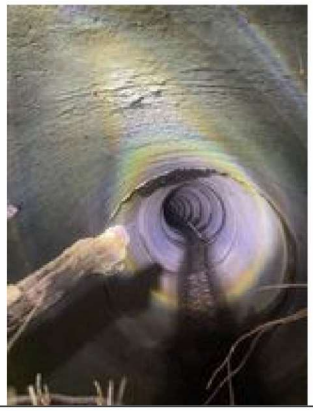





Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo







Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 21, 2024 1:21 PM

Culvert ID: Valley-2	**Road name:** Valley road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate Poor
Pavement Width: 21’ 5”	**Structure Length:** 41’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☐ Yes ☑ No			

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Unknown
Flow Condition: No Flow	**Crossing Comments:** Culvert is non visible. Outlet area is submerged. Both sides are covered by debris and water. Inlet structure may also be submerged in water and debris

Upstream Area

Approximate Bank full Width: 0’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Upstream is just a pond.

Crossing Inlet - Cannot Locate - Debris, Heavy Brush, Sediment obstruction

Inlet Shape:	**Inlet Grade:**	**Inlet Width:** ’ ” **Inlet Height:** ’ ”

Crossing Dimensions

Bend Mid-Crossing:	**Road Fill Height:** ’ ”	
Inlet Type: **Headwall Material:** Concrete **Wingwall Material:** None	**Embankment Condition:** **Headwall Condition:** **Armoring/Riprap Condition:**	
Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** ’ ” **Water Depth:** ’ ”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment:	Structural Integrity of Barrel:
Channel Alignment:	Joints and Seams:
Level of Blockage:	Footings:
Flared End Section:	Headwall/Wingwalls:
Invert Deterioration:	Armoring:
Buoyancy or Crushing:	Apron:
Cross-Section Deformation:	Embankment Piping:

Cross-section Deformation: **Embankment Piping:**	**Inlet Observations:**

Downstream Area

Downstream Channel Bankfull Width: 0’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Non visible outlet. Wetland area. Too much debris to see much of anything.	

Southampton Culvert Assessment Form

Tighe&Bond

Crossing Outlet - Cannot Locate - Debris, Heavy Brush, Sediment obstruction			
Structure Material:	**Outlet Shape:**	**Outlet Grade:**	**Outlet Width:** ' " **Outlet Height:** ' "
Crossing Dimensions			
Road Fill Height: ' "			
Headwall Material: Concrete **Wingwall Material:** None		**Embankment Condition:** **Headwall Condition:**	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** ' " **Water Depth:** ' "		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ' " **Outlet Drop to Stream Bottom:** ' "	
Outlet Condition: Structural (Longitudinal) Alignment: Channel Alignment: Level of Blockage: Flared End Section: Invert Deterioration: Buoyancy or Crushing:		Cross-Section Deformation: Structural Integrity of Barrel: Joints and Seams: Footings: Headwall/Wingwalls: Apron: Embankment Piping:	
Condition of Downstream Embankment:		**Crossing Outlet Observations:**	
Severity Ranking			
Embankment Piping:			
Cross-section Deformation:			

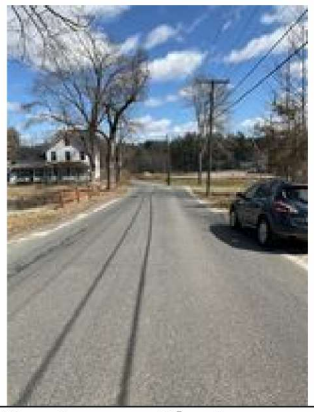
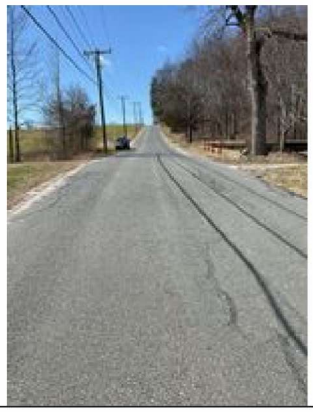
Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ' "
Internal Structures: Other **Structure Substrate Matches Stream:** Unknown	**Structure Substrate Type:** Unknown **Structure Substrate Coverage:** Unknown	**Water Depth Matches Stream:** Unknown **Water Velocity Matches Stream:** Unknown
Physical Barriers: Debris/Sediment/Rock	**Physical Barrier Severity:** Severe	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Sediment Blockage > 1/2 the opening, Channel Degradation/Headcut, No Access/Ends Totally Buried/Submerged	**Comments:** CMP pipe found likely on private property uphill of pond that also appears to cross the road from a catch basin. This could be redirected to pond. The culvert appears to be submerged still. heavy vegetation at inlet and outlet. Seems this could be another DPW repair/replacement project

Likely water main on this road.

Photo Log

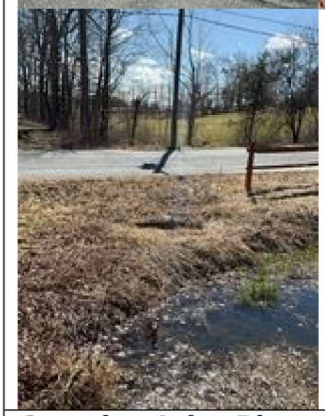
Road Photos

Upstream Photos







Downstream Embankment Photo







Crossing Inlet Photo

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Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond March 21, 2024 2:21 PM

Culvert ID: Valley-4	**Road name:** Valley road	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 19’ 3”	**Structure Length:** 40’ 0”
Road Observations:	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Other

Crossing Alignment to Roadway: No Skew	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Unknown
Flow Condition: Typical-Low Dry	**Crossing Comments:** ~~Outlet not visible.~~ Covered by ~~dead branches from tree~~, sediment, debris ~~and likely submerged~~

Upstream Area

Approximate Bank full Width: 3’ 0” **Width Confidence:** Low/Estimated **Constriction:** Spans only bankfull/active channel	**Number of Barrels:** 1 **Observations:**

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 2’ 6” **Inlet Height:** 2’ 3”

Crossing Dimensions

Bend Mid-Crossing: None	**Road Fill Height:** 1’ 1”
Inlet Type: Projecting **Headwall Material:** None **Wingwall Material:** None	**Embankment Condition:** Adequate **Headwall Condition:** NA **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1’ 4” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Adequate***
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***Adequate***	Headwall/Wingwalls: ***NA***
Invert Deterioration: ***Adequate***	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:**

Downstream Area

Downstream Channel Bankfull Width: 3’ 6” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Moderate
Tailwater Scour Pool: None	
Notes on Downstream:	

Southampton Culvert Assessment Form

Tighe&Bond

Crossing Outlet - Cannot Locate - Debris, Heavy Brush, Sediment obstruction			
Structure Material:	**Outlet Shape:** Round	**Outlet Grade:** At grade	**Outlet Width:** ' " 2'-0" **Outlet Height:** ' " 0'-10"
Crossing Dimensions			
Road Fill Height: ' "			
Headwall Material: None **Wingwall Material:** None		**Embankment Condition:** OK **Headwall Condition:** NA	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** ' " **Water Depth:** ' "		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** ' " **Outlet Drop to Stream Bottom:** ' "	
Outlet Condition: Structural (Longitudinal) Alignment: OK Channel Alignment: OK Level of Blockage: poor Flared End Section: OK Invert Deterioration: OK Buoyancy or Crushing: OK		Cross-Section Deformation: OK Structural Integrity of Barrel: OK Joints and Seams: OK Footings: NA Headwall/Wingwalls: NA Apron: NA Embankment Piping: OK	
Condition of Downstream Embankment:		**Crossing Outlet Observations:**	
Severity Ranking			
Embankment Piping: NO			
Cross-section Deformation: NO			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ' "
Internal Structures: None **Structure Substrate Matches Stream:** Comparible	**Structure Substrate Type:** Sand **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** Yes **Water Velocity Matches Stream:** Yes
Physical Barriers: Debris/Sediment/Rock	**Physical Barrier Severity:** Severe	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Maintenance **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Sediment Blockage > 1/2 the opening	**Comments:** Low priority, not functioning well. Blockage at outlet up to 8-12" below top of pipe. flared end.

Photo Log

Road Photos











Upstream Photos



Downstream Embankment Photo



Crossing Inlet Photo



Crossing Outlet Photo

Southampton Culvert Assessment Form

Tighe&Bond

Submitted By: Tighe&Bond April 26, 2024 8:47 AM

Culvert ID: Whiteloaf-2	**Road name:** Whiteloaf rd	**Stream:**
Weather: Sunny		

Roadway Information

Road Type: Paved	**Condition:** Adequate
Pavement Width: 24’ 0”	**Structure Length:** 44’ 0”
Road Observations: Crack across rd not in line with culvert skew	

	Present	Location	Material	Condition
Sidewalk	☐ Yes ☑ No			
Curbing	☐ Yes ☑ No			
Guardrail	☑ Yes ☐ No	Both Sides		Adequate

Crossing Alignment to Roadway: Skewed (<45)	**Crossing Alignment to Stream:** Flow-Aligned
Crossing Type: Culvert	**Crossing Condition:** Poor
Flow Condition: Typical-Low Dry	**Crossing Comments:** ~~Outlet submerged and maybe crushed~~

Upstream Area

Approximate Bank full Width: 0’ 0” **Width Confidence:** Low/Estimated **Constriction:** Severe	**Number of Barrels:** 1 **Observations:** Wetland

Crossing Inlet - Located -

Inlet Shape: 1 - Round Culvert	**Inlet Grade:** At Stream Grade	**Inlet Width:** 1’ 8” **Inlet Height:** 1’ 7”

Crossing Dimensions

Bend Mid-Crossing: Skewed (<45)	**Road Fill Height:** 3’ 3”
Inlet Type: Projecting, Headwall **Headwall Material:** Stone **Wingwall Material:** None	**Embankment Condition:** Poor **Headwall Condition:** Poor **Armoring/Riprap Condition:** NA

Scour: No **Scour Location:** **Scour Damage:**	**Substrate/Water Width:** 1’ 0” **Water Depth:** 0’ 0”	**Tree Present by Upstream Headwall/Wingwall:** No

Inlet Condition:

Structural (Longitudinal) Alignment: ***Adequate***	Structural Integrity of Barrel: ***Poor*** OK
Channel Alignment: ***Adequate***	Joints and Seams: ***Adequate***
Level of Blockage: ***Adequate***	Footings: ***NA***
Flared End Section: ***NA***	Headwall/Wingwalls: ***Poor***
Invert Deterioration: ***Critical*** poor	Armoring: ***NA***
Buoyancy or Crushing: **Adequate**	Apron: ***NA***
Cross-Section Deformation: ***Adequate***	Embankment Piping: ***Adequate***

Cross-section Deformation: Adequate **Embankment Piping:** Adequate	**Inlet Observations:** ~~Outlet not seen from inlet~~

Downstream Area

Downstream Channel Bankfull Width: 0’ 0” **Width Confidence:** Low/Estimated	**Number of Barrels:** 1 **Constriction:** Severe
Tailwater Scour Pool: None	
Notes on Downstream: Wetlands	

Crossing Outlet - Located -

Southampton Culvert Assessment Form

Tighe&Bond

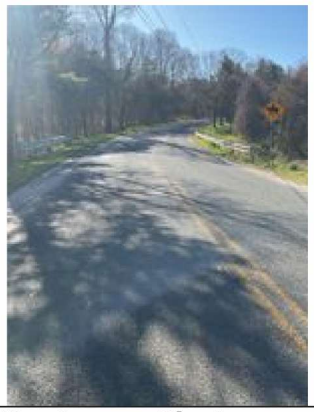
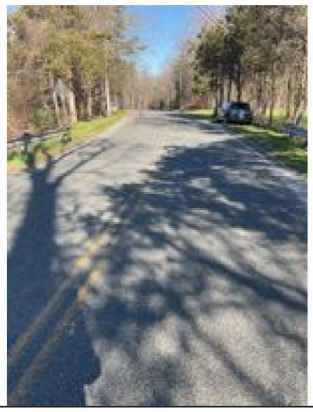
Structure Material: Metal	**Outlet Shape:** 1 - Round Culvert	**Outlet Grade:** At stream grade	**Outlet Width:** 0’ 0” **Outlet Height:** 0’ 0”
Crossing Dimensions			
Road Fill Height: 5’ 3”			
Headwall Material: Stone **Wingwall Material:** Stone		**Embankment Condition:** Critical **Headwall Condition:** Critical	
Tree Present by Downstream Headwall/Wingwall: No **Substrate/Water Width:** 0’ 0” **Water Depth:** 0’ 0”		**Abutment Height (Type 7 Bridges Only):** **Outlet Drop to Water Surface:** 0’ 0” **Outlet Drop to Stream Bottom:** 0’ 0”	
Outlet Condition: Structural (Longitudinal) Alignment: ***Unknown*** OK Channel Alignment: ***Adequate*** Level of Blockage: ***Critical*** poor Flared End Section: ***NA*** Invert Deterioration: ***Unknown*** Critical Buoyancy or Crushing: ***Critical*** OK		Cross-Section Deformation: ***Critical*** OK Structural Integrity of Barrel: ***Critical*** Joints and Seams: ***Unknown*** OK Footings: ***NA*** Headwall/Wingwalls: ***Critical*** Apron: ***NA*** Embankment Piping: ***Unknown***	
Condition of Downstream Embankment: Critical		**Crossing Outlet Observations:** ~~Outlet submerged~~. Headwalls stones have cracked and shifted leaving gaps. Water runoff from road eroding soil by pavement	
Severity Ranking			
Embankment Piping: Unknown			
Cross-section Deformation: Critical			

Operation and Maintenance Concerns		
Potential Illicit Discharged Observed: No	**Location:**	
Notes on Illicit Discharge Evidence:		
Beaver Dam near crossing: No	**Location:**	**Distance From Crossing:** ’ ”
Internal Structures: None **Structure Substrate Matches Stream:** None	**Structure Substrate Type:** None **Structure Substrate Coverage:** None	**Water Depth Matches Stream:** No - Deeper **Water Velocity Matches Stream:** No - Slower
Physical Barriers: Deformation	**Physical Barrier Severity:** None	**Physical Barrier Location:**
Dry Passage through Structure? No		

Field Recommendations: Replacement **Performance Problems Requiring Action:** Debris/Veg Blockage > 1/3 of rise, Aggressive Abrasion/Corrosion/Chemical, ~~Buoyancy or Crushing-Related Inltet Failure~~, ~~No Access/Ends Totally Buried/Submerged~~	**Comments:** Okay condition for CMP pipe at inlet. Outlet may be deteriorated full section loss below sediment fill height. Debris build-up downstream. headwall stacked stones steep. Sediment buildup at outlet

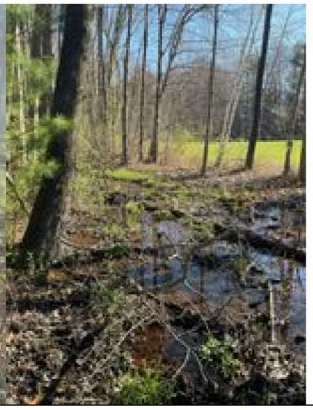
Photo Log

Road Photos

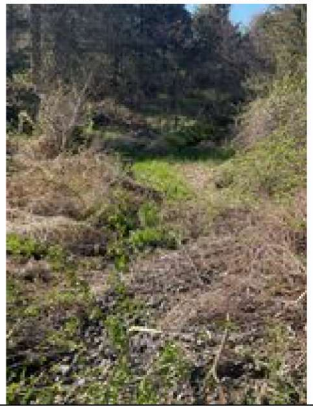





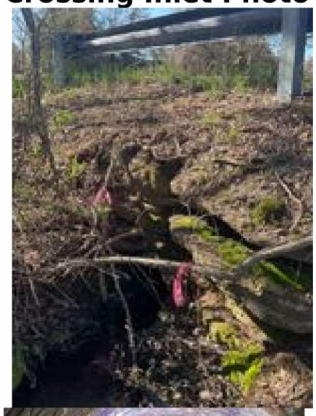
Upstream Photos

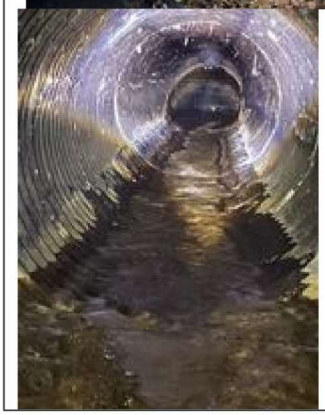
Downstream Embankment Photo



Crossing Inlet Photo



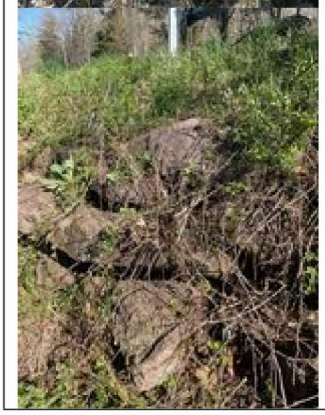




Crossing Outlet Photo









Appendix D
NAACC Culvert & Aquatic Passability PoF Scoring Systems

Culvert Condition Scoring System – August 27, 2019

Two "scores" will be assigned to each crossing:

1. Culverts with performance problems will be flagged.
2. A condition score (0.0-1.0) is calculated for each crossing, as follows:
   a) For each culvert, assign a score for each of the three variables below (V1, V2, V3) using data from the Condition Assessment Form.
   b) The minimum score resulting from V1, V2, or V3 is the overall condition score for each culvert. The score will range from 0 (most critical condition) to 1 (good condition).

      PLUS

      If any Section is marked "Unknown" then add "not fully assessed" to the score unless the score is 0.0. For example: "0.7-not fully assessed" or "0.3-not fully assessed" but not "0-not fully assessed"
   c) For multiple culvert crossings, the overall condition score for the crossing is the lowest condition score among the culverts that make up the crossing.

V1 Structural Deficiency – Highly Critical

Variables marked "Critical"	Score
Any one of the following	0.0
Cross-Section Deformation	Inlet or outlet
Structural Integrity of Barrel	Inlet or outlet
Footings	Inlet or outlet
Level of Blockage	Inlet or outlet

V2 Structural Deficiency – Critical

Any three or more of the following Any two of the following Any one of the following	0.0 0.1 0.2
Variables marked "Critical"	**Score**
Buoyancy or Crushing	Inlet or outlet or both counts as 1
Invert Deterioration	Inlet or outlet or both counts as 1
Joints and Seams	Inlet or outlet or both counts as 1
Longitudinal Alignment	Inlet or outlet or both counts as 1
Headwall/Wingwalls	Inlet or outlet or both counts as 1
Flared End Section	Inlet or outlet or both counts as 1
Apron/Scour Protection	Outlet
Armoring	Inlet or outlet or both counts as 1
Embankment Piping	Inlet or outlet or both counts as 1
Variables marked "Poor"	
Cross-Section Deformation	Inlet or outlet or both counts as 1
Structural Integrity of Barrel	Inlet or outlet or both counts as 1
Footings	Inlet or outlet or both counts as 1
Level of Blockage	Inlet or outlet or both counts as 1

V3 Structural Deficiency – Poor

Variables marked "Poor"	Score
For each of the following identified as "Poor"	0.1 pt. deduction from 1.0 down to a minimum score of 0.3
Buoyancy or Crushing	Inlet or outlet or both counts as 1
Invert Deterioration	Inlet or outlet or both counts as 1
Joints and Seams	Inlet or outlet or both counts as 1
Longitudinal Alignment	Inlet or outlet or both counts as 1
Headwall/Wingwalls	Inlet or outlet or both counts as 1
Flared End Section	Inlet or outlet or both counts as 1
Apron/Scour Protection	Outlet
Armoring	Inlet or outlet or both counts as 1
Embankment Piping	Inlet or outlet or both counts as 1

Tighe & Bond added criteria:

"Assessment Complete"

Both Inlet & Outlet Not Assessed	0
Inlet or Outlet Not Assessed	0.15
Assessment Completed	1

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.

N/A: We did not use the Coarse Screen and instead used the numeric scoring system to be able to more fully assess each culvert's aquatic passability.

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).

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.

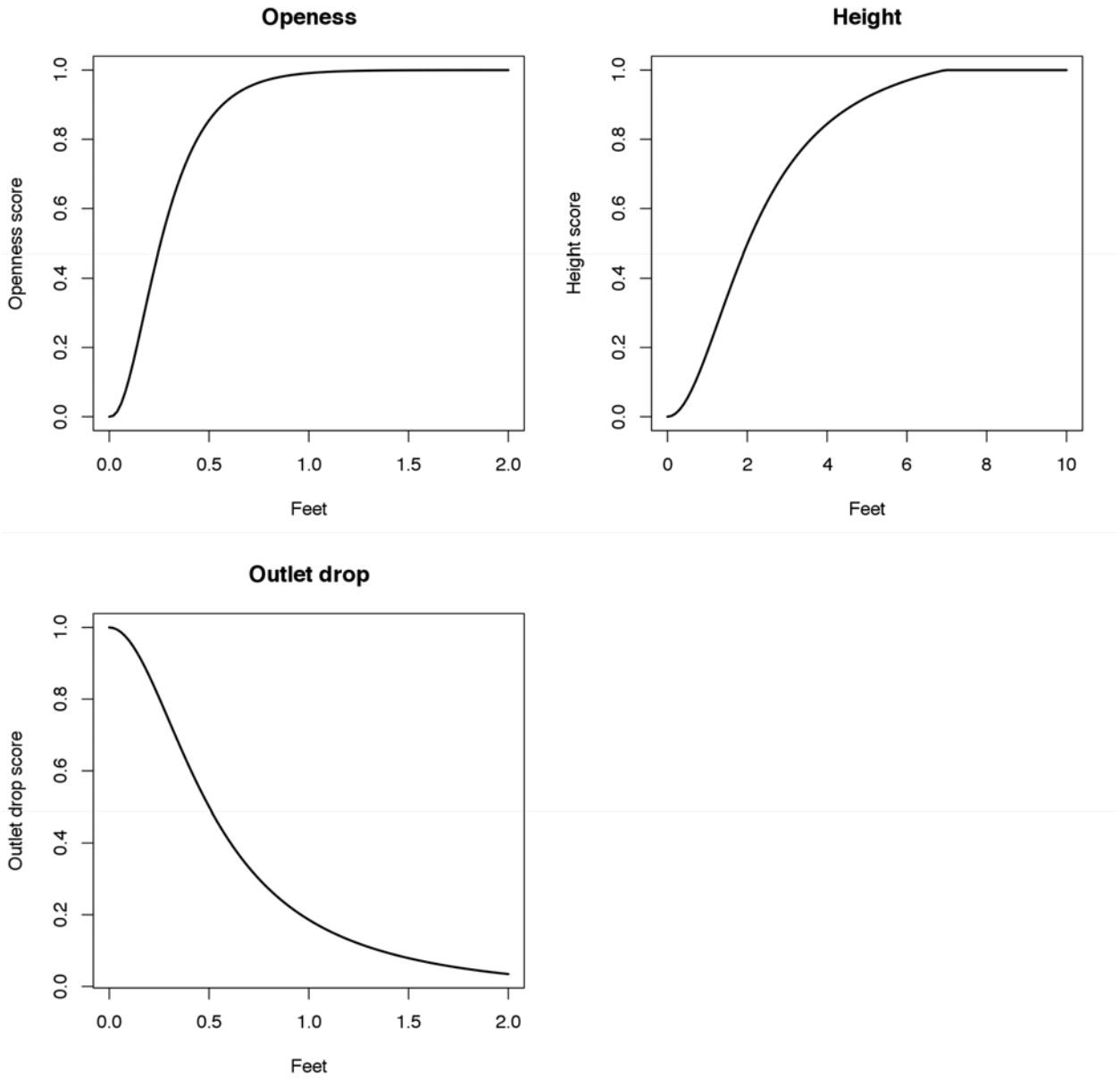


Figure 1. Continuous predictor variables

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

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

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)
}
```

Appendix E
Consequence of Failure Evaluation Criteria

Consequence of Failure (CoF) Evaluation Criteria

The following descriptions provide an overview of the CoF evaluation criteria for culverts that were assessed during field work.

Culvert Size: Larger culverts typically convey a more substantial flow than smaller ones and present a higher consequence if they are to fail.

Culvert Length: Failure of culverts with larger lengths may be more challenging to replace or restore.

Span > 1.2 x Bankfull Width (*Part of MA Stream Crossing Standards*): An evaluation of the assessed culverts' bankfull width ratio was evaluated to determine whether the culverts met one of the Massachusetts Stream Crossing Standards. In accordance with the Standard, culvert spans should be a minimum of 1.2 times the bankfull width of the stream. Culverts that do not meet this Standard may be considered undersized and may not be sufficient to meet hydraulic and/or wildlife passage requirements. Please note, other Massachusetts Stream Crossing Standards (such as embedment, openness, substrate, water depth and velocity) were not analyzed for this component of the CoF.

Known Flooding Area / Problem Culvert: Assets located in areas that already experience flooding or roadway overtopping during storm events would have a more significant impact in the event of a failure. Known flooding areas in Southampton were identified by Town staff and the Town of Southampton's *Natural Hazard Mitigation Plan Update* (2016). The figure included in this appendix demonstrates these areas throughout Town.

Proximity to Floodplains: A failure within a floodplain will have a greater impact during a flooding event, leading to exacerbated flooding. The 100-year and 500-year Federal Emergency Management Agency (FEMA) flood zones were used for this analysis.

Natural Heritage and Endangered Species (NHESP) Priority or Estimated Habitat: A failure in a mapped habitat area could have a detrimental impact to an endangered, threatened, or special concern species or the natural communities that make up their habitats.

Building Proximity: Culverts within close proximity of a building may have more detrimental effects on the building itself or those attempting to access the building.

Impacting Critical Customer: A high priority CoF factor determined during the Level of Service Workshop was the impact of a culvert failure on critical customers in Town. Critical customers include facilities such as hospitals and schools, and critical infrastructure such as a water supply tank. Critical customers were identified for Southampton at the Workshop and in the 2016 *Natural Hazard Mitigation Plan Update*. The figure included in this appendix demonstrates these critical customers throughout Town.

Major Utility Crossing (Water): A culvert that has a water main crossing and fails has a higher potential to negatively impact the public drinking water distribution system. The Town's water GIS mapping was used to determine locations where a water main crosses the culvert. Note that failure of culverts with other utility crossings (e.g., gas mains or telecommunications) would also have a negative effect on those utilities; however, data was not collected on other utilities as part of this Asset Management Plan.

Dead End Houses or Detour Length: If a culvert were to fail and close a road, this item considered the number of houses that would be impacted on a dead-end road or the length of a detour for through-streets.

Roadway Class or Type: Failure of culverts on major roadways will have a greater impact on public safety, residents, and commuters, and require greater construction and traffic control coordination depending on the criticality of the road. We utilized MassGIS's field class[1] for MassDOT roadways:

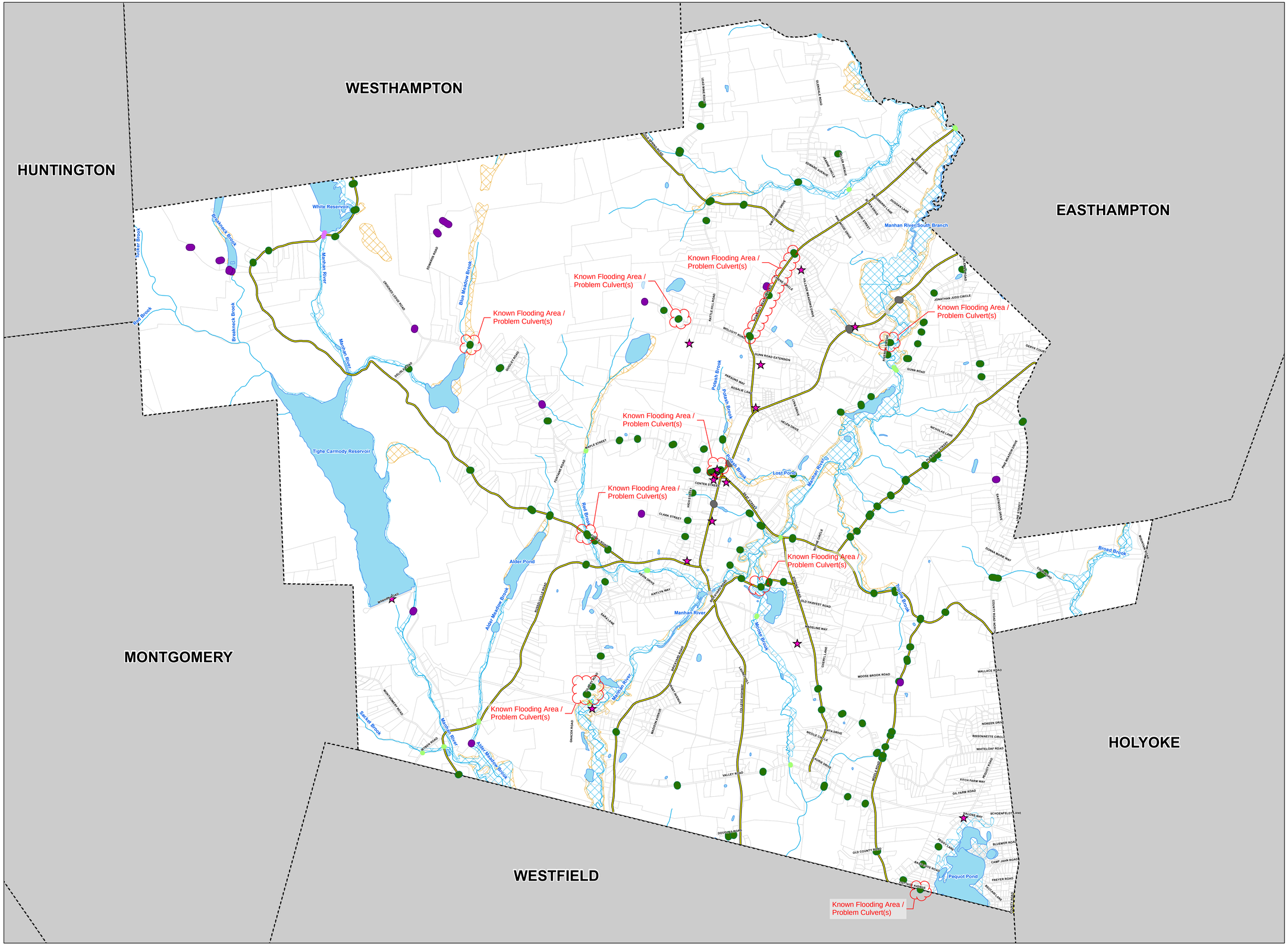
- **1** - Limited Access Highway
- **2** - Multi-lane Highway, not limited access
- **3** - Other numbered route (e.g., Route 113, Route 3A, etc.)
- **4** - Major road - arterials and collectors
- **5** - Minor street or road *(with Road Inventory information, not class 1-4)*
- **6** - Minor street or road *(with minimal Road Inventory information and no street name)*
- **Railroad Crossing**
- **Off-road**

Note that no culverts were located on roadway types 1, 2, 3, 6, or Railroad Crossings, thus those types were not included in the scoring of the CoF criteria.

Evacuation Route: Failure of culverts on an evacuation route will have a significant impact on public safety. These routes were identified for Southampton in the 2016 *Natural Hazard Mitigation Plan Update*.

[1] https://www.mass.gov/info-details/massgis-data-massachusetts-department-of-transportation-massdot-roads#attributes-

Figure 1
Critical Assets



LEGEND

- Critical Customer
- Southampton Bridges Ownership
  - Easthampton
  - Private
  - State
  - Town
- Southampton Culverts Ownership
  - Private
  - State
  - Town
- Primary Evacuation Route
- Hydrology Line
- Waterbody
- 100 Year Flood Zone
- 500 Year Flood Zone
- Parcel Boundary
- Town Boundary

LOCUS MAP



0 3,300
Feet

1:19,800

NOTES

1. Based on USGS Topo Map (1987)
2. MassGIS: Community Boundary (2022), National Wetlands Inventory (2020), MassDOT Major Roads (2023)
3. Town of Southampton: Culverts

Map of Culvert Locations
Southampton, Massachusetts

October 2024

Tighe&Bond

G:\GIS\MA\SouthamptonMA\MapDocs\Culverts_24x36_Southampton.mxd Date Saved: 10/23/2024 User: CGoss-Baker

S-5005

The following table includes the scores and weighting factors used in the assessment for each CoF criteria.

TABLE E-1
Culvert CoF Evaluation Criteria

Category/Item	Rating Factor	Score	Weight	Max Score
Culvert Size (ft)	> 3	5	2	10
	2 < size ≤ 3	4		
	Unknown	3		
	1 < size ≤ 2	2		
	≤ 1	1		
Culvert Length (ft)	> 100	5	1	5
	50 < length ≤ 100	3		
	≤ 50	1		
Span > 1.2 x Bankfull Width (*Part of MA Stream Crossing Standards*)	Does Not Meet Standard (span< 1.2xBW)	5	1	5
	Not Measured	3		
	Meets Standards (span> 1.2xBW)	1		
Known Flooding Issues / Problem Culvert	Yes	5	1	5
	No	1		
Within 100- or 500-yr FEMA Flood Zones	Yes	5	1	5
	No	1		
Within NHESP Priority / Estimated Habitat	Yes	5	1	5
	No	1		
Building Proximity	Within 20’ of a structure	5	1	5
	Greater than 20’ from a structure	1		
Impact to Critical Customers	Yes - within 100' of critical parcel	5	1	5
	No	1		
Roadway Class or Type	Off-road	0	2	10
	4 - Major road	5		
	5 - Minor street or road	1		
Evacuation Route	Yes	5	2	10
	No	1		
Major Utility Crossing (water)	Yes	5	1	5
	No	1		
Dead End Houses	≥ 20	5	2	10
	15-19	4		
	10-14	3		
	6-9	2		
	≤ 5	1		
Detour Length	> 4 miles	5		
	3 to 4 miles	4		
	2 to 3 miles	3		
	Off-road	0		
	1 to 2 miles	2		
	< 1 mile	1		

TOTAL: 80

Appendix F
Criticality Assessment Summary

Appendix F - Criticality Assessment Summary

ID	Asset Type	Address	Road Type	Ownership	PoF Score	CoF Score	Criticality Rank
Brickyard-1	Culvert	Brickyard Rd	Paved	Town	0.00	0.48	High
Brickyard-2	Culvert	Brickyard Rd	Unpaved	Town	0.00	0.53	Medium-High PoF
Brickyard-3	Culvert	Brickyard Rd	Unpaved	Town	1.00	0.40	Medium-High CoF
Brickyard-4	Culvert	Brickyard Rd	Paved	Town	0.00	0.53	Medium-High PoF
Brickyard-5	Culvert	Brickyard Rd	Paved	Town	0.00	0.60	Medium-High PoF
Brittney-1	Bridge	Brittney Ln	N/A	Town	N/A	N/A	N/A
Clark-1	Culvert	Clark St	N/A	Private	N/A	N/A	N/A
Clark-2	Culvert	Clark St	Paved	Town	0.20	0.55	Medium-High PoF
ColdSpring-1	Culvert	Cold Spring Rd	Paved	Town	1.00	0.33	Medium-High CoF
ColdSpring-2	Culvert	Cold Spring Rd	Paved	Town	0.10	0.38	High
Coleman-1	Culvert	Coleman Rd	Paved	Town	0.10	0.58	Medium-High PoF
Coleman-2	Culvert	Coleman Rd	Paved	Town	0.80	0.65	Low
Coleman-3	Culvert	Coleman Rd	Paved	Town	0.00	0.65	Medium-High PoF
College-1	Bridge	College Hwy	N/A	State	N/A	N/A	N/A
College-2	Culvert	College Hwy	N/A	State	N/A	N/A	N/A
College-3	Culvert	College Hwy	N/A	State	N/A	N/A	N/A
College-4	Culvert	College Hwy	N/A	State	N/A	N/A	N/A
College-5	Bridge	College Hwy	N/A	State	N/A	N/A	N/A
College-6	Culvert	College Hwy	N/A	State	N/A	N/A	N/A
Cook-1	Culvert	Cook Rd	Paved	Town	0.00	0.50	High
Cottage-1	Culvert	Cottage Ave	Paved	Town	0.00	0.68	Medium-High PoF
County-1	Culvert	County Rd N	Paved	Town	1.00	0.38	Medium-High CoF
CrookedLedge-1	Culvert	Crooked Ledge Rd	Unpaved	Town	0.00	0.60	Medium-High PoF
CrookedLedge-2	Culvert	Crooked Ledge Rd	N/A	Private	N/A	N/A	N/A
CrookedLedge-3	Culvert	Crooked Ledge Rd	Unpaved	Town	0.00	0.50	High
CrookedLedge-4	Culvert	Crooked Ledge Rd	Paved	Town	0.20	0.63	Medium-High PoF
CrookedLedge-5	Culvert	Crooked Ledge Rd	N/A	Private	N/A	N/A	N/A
CrookedLedge-6	Culvert	Crooked Ledge Rd	Paved	Town	0.90	0.63	Low
Delisle-1	Culvert	Delisle Rd	Paved	Town	0.20	0.48	Medium-High CoF
Douglas-1	Culvert	Douglas Rd	Paved	Town	0.00	0.65	Medium-High PoF
Douglas-2	Culvert	Douglas Rd	Paved	Town	0.00	0.78	Medium-High PoF
East-1	Bridge	East St	N/A	Town	N/A	N/A	N/A
East-2	Culvert	East St	Paved	Town	0.20	0.43	Medium-High CoF
East-3	Culvert	East St	Paved	Town	0.15	0.53	Medium-High PoF
East-4	Culvert	East St	Paved	Town	0.20	0.45	Medium-High CoF
East-5	Culvert	East St	Paved	Town	0.20	0.53	Medium-High PoF
East-6	Culvert	East St	Paved	Town	0.80	0.55	Low
Eastwood-1	Culvert	Eastwood Dr	N/A	Private	N/A	N/A	N/A
Edwards-1	Culvert	Edwards Rd	N/A	Private	N/A	N/A	N/A
Edwards-2	Culvert	Edwards Rd	N/A	Private	N/A	N/A	N/A
Fomer-1	Culvert	Fomer Rd	Unpaved	Town	0.00	0.53	Medium-High PoF
Fomer-10	Culvert	Fomer Rd	N/A	Private	N/A	N/A	N/A
Fomer-13	Bridge	Fomer Rd	N/A	Town	N/A	N/A	N/A
Fomer-17	Culvert	Fomer Rd	Paved	Town	0.20	0.50	Medium-High CoF
Fomer-19	Culvert	Fomer Rd	Paved	Town	0.80	0.45	Medium-High CoF
Fomer-2	Culvert	Fomer Rd	Unpaved	Town	0.00	0.43	High

Appendix F - Criticality Assessment Summary

ID	Asset Type	Address	Road Type	Ownership	PoF Score	CoF Score	Criticality Rank
Fomer-20	Culvert	Fomer Rd	Paved	Town	0.20	0.50	Medium-High CoF
Fomer-21	Culvert	Fomer Rd	Paved	Town	0.90	0.45	Medium-High CoF
Fomer-22	Culvert	Fomer Rd	Paved	Town	0.20	0.55	Medium-High PoF
Fomer-23	Culvert	Fomer Rd	Paved	Town	0.00	0.60	Medium-High PoF
Fomer-3	Bridge (Short Span)	Fomer Rd	N/A	Private	N/A	N/A	N/A
Fomer-4	Culvert	Fomer Rd	Unpaved	Town	0.00	0.53	Medium-High PoF
Fomer-5	Culvert	Fomer Rd	Unpaved	Town	0.00	0.53	Medium-High PoF
Fomer-7	Culvert	Fomer Rd	N/A	Private	N/A	N/A	N/A
Fomer-8	Culvert	Fomer Rd	N/A	Private	N/A	N/A	N/A
Fomer-9	Culvert	Fomer Rd	N/A	Private	N/A	N/A	N/A
Gilbert-1	Culvert	Gilbert Rd	Paved	Town	0.10	0.60	Medium-High PoF
Gilbert-2	Culvert	Gilbert Rd	Paved	Town	0.10	0.58	Medium-High PoF
Gilbert-3	Culvert	Gilbert Rd	Paved	Town	0.00	0.43	High
Gilbert-4	Culvert	Gilbert Rd	Paved	Town	0.15	0.50	High
Gilbert-5	Bridge	Gilbert Rd	N/A	Town	N/A	N/A	N/A
Glendale-1	Bridge	Glendale Rd	N/A	Easthampton	N/A	N/A	N/A
Glendale-2	Culvert	Glendale Rd	Paved	Town	1.00	0.43	Medium-High CoF
Glendale-3	Bridge (Short Span)	Glendale Rd	N/A	Town	N/A	N/A	N/A
Gunn-1	Bridge	Gunn Rd	N/A	Town	N/A	N/A	N/A
High-1	Culvert	High St	Paved	Town	1.00	0.70	Low
High-2	Culvert	High St	Paved	Town	0.20	0.60	Medium-High PoF
High-3	Culvert	High St	Paved	Town	1.00	0.65	Low
High-4	Culvert	High St	Paved	Town	0.00	0.65	Medium-High PoF
High-5	Culvert	High St	Paved	Town	1.00	0.55	Low
LeadMine-1	Culvert	Leadmine Rd	Paved	Town	1.00	0.63	Low
LeadMine-2	Culvert	Leadmine Rd	Paved	Town	1.00	0.63	Low
LeadMine-3	Culvert	Leadmine Rd	Paved	Town	1.00	0.63	Low
LeadMine-4	Culvert	Leadmine Rd	Paved	Town	1.00	0.55	Low
Line-1	Culvert	Line St	Paved	Town	1.00	0.50	Medium-High CoF
Manhan-1	Culvert	Manhan Rd	N/A	Private	N/A	N/A	N/A
Maple-1	Bridge (Short Span)	Maple St	N/A	Town	N/A	N/A	N/A
Maple-2	Culvert	Maple St	Paved	Town	0.10	0.63	Medium-High PoF
Maple-3	Culvert	Maple St	Paved	Town	0.20	0.63	Medium-High PoF
Maple-4	Culvert	Maple St	Paved	Town	0.00	0.60	Medium-High PoF
Maple-5	Culvert	Maple St	Paved	Town	0.90	0.63	Low
Middle-1	Culvert	Middle Rd	Paved	Town	0.70	0.50	Medium-High CoF
Middle-10	Culvert	Middle Rd	Paved	Town	1.00	0.58	Low
Middle-11	Culvert	Middle Rd	Paved	Town	0.15	0.55	Medium-High PoF
Middle-2	Culvert	Middle Rd	Paved	Town	0.00	0.40	High
Middle-3	Culvert	Middle Rd	Paved	Town	0.15	0.60	Medium-High PoF
Middle-4	Culvert	Middle Rd	N/A	Private	N/A	N/A	N/A
Middle-6	Culvert	Middle Rd	Paved	Town	0.10	0.58	Medium-High PoF
Middle-7	Culvert	Middle Rd	Paved	Town	0.90	0.58	Low
Middle-8	Culvert	Middle Rd	Paved	Town	1.00	0.58	Low
Middle-9	Culvert	Middle Rd	Paved	Town	1.00	0.58	Low
Miller-1	Culvert	Miller Ave	Paved	Town	0.00	0.65	Medium-High PoF

Appendix F - Criticality Assessment Summary

ID	Asset Type	Address	Road Type	Ownership	PoF Score	CoF Score	Criticality Rank
Miller-2	Bridge	Miller Ave	N/A	Town	N/A	N/A	N/A
MooseBrook-1	Bridge	Moose Brook Rd	N/A	Town	N/A	N/A	N/A
Pequot-1	Culvert	Pequot Rd	Paved	Town	0.00	0.68	Medium-High PoF
Pequot-2	Culvert	Pequot Rd	Paved	Town	Unknown	Unknown	Unknown
Pequot-3	Culvert	Pequot Rd	Paved	Town	0.20	0.58	Medium-High PoF
Pleasant-1	Culvert	Pleasant St	Paved	Town	1.00	0.30	Medium-High CoF
Pleasant-10	Culvert	Pleasant St	Paved	Town	0.00	0.48	High
Pleasant-11	Culvert	Pleasant St	Paved	Town	0.20	0.45	Medium-High CoF
Pleasant-2	Culvert	Pleasant St	Paved	Town	0.80	0.43	Medium-High CoF
Pleasant-3	Culvert	Pleasant St	Paved	Town	1.00	0.48	Medium-High CoF
Pleasant-4	Culvert	Pleasant St	Paved	Town	1.00	0.55	Low
Pleasant-5	Culvert	Pleasant St	Paved	Town	1.00	0.48	Medium-High CoF
Pleasant-6	Culvert	Pleasant St	Paved	Town	1.00	0.48	Medium-High CoF
Pleasant-7	Culvert	Pleasant St	Paved	Town	0.15	0.58	Medium-High PoF
Pleasant-8	Culvert	Pleasant St	Paved	Town	0.00	0.50	High
Pleasant-9	Culvert	Pleasant St	Paved	Town	1.00	0.45	Medium-High CoF
PomeroyMeadow-1	Culvert	Pomeroy Meadow Rd	Paved	Town	0.20	0.30	Medium-High CoF
PomeroyMeadow-2	Culvert	Pomeroy Meadow Rd	Paved	Town	1.00	0.40	Medium-High CoF
PomeroyMeadow-3	Culvert	Pomeroy Meadow Rd	N/A	Private	N/A	N/A	N/A
PomeroyMeadow-4	Culvert	Pomeroy Meadow Rd	Paved	Town	1.00	0.30	Medium-High CoF
PomeroyMeadow-5	Bridge	Pomeroy Meadow Rd	N/A	Town	N/A	N/A	N/A
Railroad-1	Culvert	Manhan Rail Trail	Trail	Town	0.00	0.60	Medium-High PoF
Railroad-10	Culvert	Manhan Rail Trail	Trail	Town	0.00	0.63	Medium-High PoF
Railroad-11	Culvert	Manhan Rail Trail	Trail	Town	0.00	0.60	Medium-High PoF
Railroad-12	Culvert	Manhan Rail Trail	Trail	Town	0.20	0.68	Medium-High PoF
Railroad-13	Culvert	Manhan Rail Trail	Paved	Town	0.20	0.60	Medium-High PoF
Railroad-2	Culvert	Manhan Rail Trail	Trail	Town	0.60	0.63	Low
Railroad-3	Culvert	Manhan Rail Trail	Trail	Town	0.20	0.48	Medium-High CoF
Railroad-4	Culvert	Manhan Rail Trail	Trail	Town	0.00	0.55	Medium-High PoF
Railroad-5	Culvert	Manhan Rail Trail	Trail	Town	0.00	0.63	Medium-High PoF
Railroad-6	Culvert	Manhan Rail Trail	Trail	Town	0.10	0.63	Medium-High PoF
Railroad-7	Culvert	Manhan Rail Trail	Trail	Town	0.20	0.70	Medium-High PoF
Railroad-8	Culvert	Manhan Rail Trail	Trail	Town	0.00	0.63	Medium-High PoF
Railroad-9	Culvert	Manhan Rail Trail	Trail	Town	0.80	0.70	Low
RailroadBridge-1	Bridge	Manhan Rail Trail	N/A	Town	N/A	N/A	N/A
RailroadBridge-2	Bridge	Manhan Rail Trail	N/A	Town	N/A	N/A	N/A
RattleHill-1	Culvert	Rattle Hill Rd	Paved	Town	0.20	0.65	Medium-High PoF
Riverdale-1	Culvert	Riverdale Rd	Paved	Town	0.20	0.45	Medium-High CoF
Riverdale-2	Culvert	Riverdale Rd	Paved	Town	0.15	0.58	Medium-High PoF
Russellville-1	Culvert	Russellville Rd	Paved	Town	0.90	0.50	Medium-High CoF
Russellville-2	Bridge	Russellville Rd	N/A	Town	N/A	N/A	N/A
Russellville-3	Bridge	Russellville Rd	N/A	Town	N/A	N/A	N/A
Russellville-4	Culvert	Russellville Rd	N/A	Private	N/A	N/A	N/A
Russellville-5	Bridge (Short Span)	Russellville Rd	N/A	Town	N/A	N/A	N/A
Russellville-6	Culvert	Russellville Rd	Paved	Town	0.00	0.60	Medium-High PoF
Russellville-7	Bridge	Russellville Rd	N/A	Town	N/A	N/A	N/A

Appendix F - Criticality Assessment Summary

ID	Asset Type	Address	Road Type	Ownership	PoF Score	CoF Score	Criticality Rank
Strong-1	Culvert	Strong Rd	Paved	Town	0.15	0.53	Medium-High PoF
Strong-2	Culvert	Strong Rd	Paved	Town	0.00	0.48	High
TownHall-1	Culvert	College Hwy	Driveway	Town	0.00	0.45	High
Valley-1	Culvert	Valley Rd	Paved	Town	0.20	0.60	Medium-High PoF
Valley-2	Culvert	Valley Rd	Paved	Town	0.00	0.55	Medium-High PoF
Valley-3	Bridge	Valley Rd	N/A	Town	N/A	N/A	N/A
Valley-4	Culvert	Valley Rd	Paved	Town	0.20	0.63	Medium-High PoF
Valley-5	Culvert	Valley Rd	Paved	Town	1.00	0.73	Low
Valley-6	Culvert	Valley Rd	Paved	Town	0.20	0.73	Medium-High PoF
Whiteloaf-1	Culvert	Whiteloaf Rd	Paved	Town	0.20	0.65	Medium-High PoF
Whiteloaf-2	Culvert	Whiteloaf Rd	Paved	Town	0.00	0.68	Medium-High PoF
Whiteloaf-3	Culvert	Whiteloaf Rd	Paved	Town	0.10	0.63	Medium-High PoF
Wolcott-1	Culvert	Wolcott Rd	N/A	Private	N/A	N/A	N/A
Wolcott-2	Culvert	Wolcott Rd	Unpaved	Town	1.00	0.75	Low
Wolcott-3	Culvert	Wolcott Rd	Unpaved	Town	0.00	0.78	Medium-High PoF
Wyben-1	Bridge (Short Span)	Wyben Rd	N/A	Town	N/A	N/A	N/A

Appendix G
Culvert Replacement Project Summaries and OPCCs

Project Summary

Culvert ID	Summary Statistics [1]	Summary of Findings and Observations	Probability of Failure (PoF)	Consequence of Failure (CoF)	Criticality Rank	Recommendations	OPCC [2]
Middle-2 Middle Rd	Single barrel culvert Corrugated metal pipe Diameter: 30” Road fill height: 6’ Roadway width: 22’ Culvert length: 110’ Bankfull width – Field measured: 10’ StreamStats: 8.27’	• Critical headwall condition at the inlet • Poor headwall condition at the outlet • Critical invert deterioration throughout • Located on an evacuation route • Road closure would cause >4 mile detour	High PoF (0.0)	High CoF (0.40)	**High** (0.0)	Rehabilitation CIPP Lining; Replace Headwalls/Wingwalls	$240,000 (see OPCC on next page)






[1] See the GIS data for a complete log of information gathered during field assessments.

[2] This is an engineer’s Opinion of Probable Construction Cost (OPCC). Tighe & Bond has no control over the cost or availability of labor, equipment or materials, or over market conditions or the Contractor’s method of pricing. The OPCC is made on the basis of Tighe & Bond’s professional judgment and experience. Tighe & Bond makes no guarantee nor warranty, expressed or implied, that the bids or the negotiated cost of the Work will not vary from this OPCC.

Planning Level Engineer's Opinion of Probable Cost
Middle-2 (30" Corrugated Metal Pipe, 110' Long) Culvert Rehabilitation
Middle Road
Town of Southampton, MA

ITEM	DESCRIPTION	QTY	UNITS	UNIT PRICE	AMOUNT
151.2	Gravel Borrow for Backfilling Wingwalls	130	CY	$ 100	$ 13,000
748.	Mobilization	1	LS	$ 5,000	$ 5,000
850.	Maintenance of Traffic	1	LS	$ 30,000	$ 30,000
991.1	Control of Water	1	LS	$ 20,000	$ 20,000
995.011	Culvert Structure (Headwall, Wingwall)	1	LS	$ 75,000	$ 75,000
	Cured-in-place (CIPP) Lining	110	LF	$ 250	$ 27,500
				Subtotal	$ 170,500
	Construction Contingency		20%		$ 35,000
	Material and Bidding Contingency		20%		$ 34,100
				Subtotal	$ 69,100
				TOTAL	**$ 239,600**
				SAY	**$ 240,000**

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Project Summary

Culvert ID	Summary Statistics [1]	Summary of Findings and Observations	Probability of Failure (PoF)	Consequence of Failure (CoF)	Criticality Rank	Recommendations	OPCC [2]
Gilbert-3 Gilbert Rd	Single barrel culvert Type: Corrugated metal pipe Diameter: 30” Road fill height: 3’ 6” Roadway width: 25’ Culvert length: 44’ Bankfull width – Field measured: 0’ (woods) StreamStats: 5.65’	• Critical upstream roadway embankment • Critical invert deterioration at the inlet • Critical crushing and cross-section deformation causing poor level of blockage at the inlet • Critical structural integrity at the inlet • Poor invert deterioration at the outlet • Known flooding issues/problem area • Within NHESP area • Water main crossing • Road closure would case >4 mile detour	High PoF (0.0)	High CoF (0.43)	**High** (0.0)	Replacement Concrete Box Length: 50’ Span: 7’	$680,000 (see OPCC on next page)



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Tighe&Bond

April 2025

Planning Level Engineer's Opinion of Probable Cost

Gilbert-3 (7' Box Culvert, 50' Long) Culvert Replacement

Gilbert Road

Town of Southampton, MA

ITEM	DESCRIPTION	QTY	UNITS	UNIT PRICE	AMOUNT
101.	Clearing and Grubbing	0.10	ACRE	$ 65,000	$ 6,500
116.1	Demolition of Existing Culvert	1	LS	$ 30,000	$ 30,000
140.1	Culvert Excavation	160	CY	$ 65	$ 10,400
151.	Gravel Borrow	400	CY	$ 100	$ 40,000
156.1	Crushed Stone for Bridge Foundations	40	TON	$ 100	$ 4,000
170.	Fine Grading and Compacting	170	SY	$ 10	$ 1,700
415.1	Pavement Milling	150	SY	$ 10	$ 1,500
460.	Hot Mix Asphalt	60	TON	$ 250	$ 15,000
620.12	Guardrail, TL2 (Single-Faced)	100	FT	$ 45	$ 4,500
627.82	Guardrail Tangent End Treatment, TL-2	4	EA	$ 5,700	$ 22,800
748.	Mobilization	1	LS	$ 15,000	$ 15,000
850.	Maintenance of Traffic	1	LS	$ 30,000	$ 30,000
986.	Modified Rockfill	60	TON	$ 100	$ 6,000
991.1	Control of Water - Structure No. 1	1	LS	$ 20,000	$ 20,000
995.011	Culvert Structure, Culvert No. 1	1	LS	$ 200,000	$ 200,000
	Utility Allowance	1	LS	$ 50,000	$ 50,000
	Minor Item Allowance	1	LS	$ 25,000	$ 25,000
				Subtotal	$ 482,400
	Construction Contingency		20%		$ 97,000
	Material and Bidding Contingency		20%		$ 96,500
				Subtotal	$ 193,500
				TOTAL	**$ 675,900**
				SAY	**$ 680,000**

This is an engineer's Opinion of Probable Construction Cost (OPCC). Tighe & Bond has no control over the cost or availability of labor, equipment or materials, market conditions or the Contractor's method of pricing, and that the estimates of probable construction costs are made on the basis of the Tighe & Bond's professional judgment and experience. Tighe & Bond makes no guarantee nor warranty, expressed or implied, that the bids or the negotiated cost of the Work will not vary from this estimate of the Probable Construction Cost.

Project Summary

Culvert ID	Summary Statistics [1]	Summary of Findings and Observations	Probability of Failure (PoF)	Consequence of Failure (CoF)	Criticality Rank	Recommendations	OPCC [2]
Brickyard-1 Brickyard Rd	Single barrel culvert Type: Corrugated metal pipe (inlet) and HDPE (outlet) Diameter: 18” Road fill height: 0’ 6” Roadway width: 21’ Culvert length: 36’ 9” Bankfull width – Field measured: 0’ (pond) StreamStats: 0’ (unmapped)	• Critical upstream roadway embankment • Critical invert deterioration at the inlet • Poor cross-section deformation at the inlet • Critical structural integrity of the inlet barrel • Critical headwall condition at the inlet • Poor structural alignment at the outlet • Critical joints and seams at the outlet • Located on an evacuation route • Water main crossing • Road closure would cause >4 mile detour	High PoF (0.0)	High CoF (0.48)	**High** (0.0)	Replacement Round Pipe Length: 40’ Diameter: 60”	$305,000 (see OPCC on next page)






[1] See the GIS data for a complete log of information gathered during field assessments.

[2] This is an engineer’s Opinion of Probable Construction Cost (OPCC). Tighe & Bond has no control over the cost or availability of labor, equipment or materials, or over market conditions or the Contractor’s method of pricing. The OPCC is made on the basis of Tighe & Bond’s professional judgment and experience. Tighe & Bond makes no guarantee nor warranty, expressed or implied, that the bids or the negotiated cost of the Work will not vary from this OPCC.

Planning Level Engineer's Opinion of Probable Cost
Brickyard-1 (60" RCP, 40' Long) Culvert Replacement
Brickyard Road
Town of Southampton, MA

ITEM	DESCRIPTION	QTY	UNITS	UNIT PRICE	AMOUNT
101.	Clearing and Grubbing	0.1	ACRE	$ 65,000	$ 6,500
116.1	Demolition of Existing Culvert	1	LS	$ 30,000	$ 30,000
140.1	Culvert Excavation	10	CY	$ 65	$ 650
151.	Gravel Borrow	60	CY	$ 100	$ 6,000
241.60	60 Inch Reinforced Concrete Pipe	1	LS	$ 30,000	$ 30,000
415.1	Pavement Milling	120	SY	$ 10	$ 1,200
460.	Hot Mix Asphalt	4	TON	$ 250	$ 1,000
748.	Mobilization	1	LS	$ 11,000	$ 11,000
850.	Maintenance of Traffic	1	LS	$ 30,000	$ 30,000
986.	Modified Rockfill	50	TON	$ 100	$ 5,000
991.1	Control of Water - Structure No. 1	1	LS	$ 20,000	$ 20,000
	Utility Allowance	1	LS	$ 50,000	$ 50,000
	Minor Item Allowance	1	LS	$ 25,000	$ 25,000
				Subtotal	$ 216,350
	Construction Contingency		20%		$ 44,000
	Material and Bidding Contingency		20%		$ 43,300
				Subtotal	$ 87,300
				TOTAL	**$ 303,650**
				SAY	**$ 305,000**

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Project Summary

Culvert ID	Summary Statistics [1]	Summary of Findings and Observations	Probability of Failure (PoF)	Consequence of Failure (CoF)	Criticality Rank	Recommendations	OPCC [2]
Pleasant-8 Pleasant St	Single barrel culvert Type: Corrugated metal pipe Diameter: 12” Road fill height: 4’ 6” Roadway width: 21’ Culvert length: 39’ Bankfull width – Field measured: 0’ (pond) StreamStats: 0’ (unmapped)	• Poor structural integrity and crushing conditions at the inlet • Critical cross-section deformation mid-culvert where there appears to be an obstruction • Located on an evacuation route • Water main crossing • Road closure would cause >4 mile detour	High PoF (0.0)	High CoF (0.50)	**High** (0.0)	Replacement Round Pipe Length: 40’ Diameter: 60”	$365,000 (see OPCC on next page)






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Planning Level Engineer's Opinion of Probable Cost
Pleasant-8 (60" RCP, 40' Long) Culvert Replacement
Pleasant Street
Town of Southampton, MA

ITEM	DESCRIPTION	QTY	UNITS	UNIT PRICE	AMOUNT
101.	Clearing and Grubbing	0.10	ACRE	$ 65,000	$ 6,500
116.1	Demolition of Existing Culvert	1	LS	$ 30,000	$ 30,000
140.1	Culvert Excavation	100	CY	$ 65	$ 6,500
151.	Gravel Borrow	335	CY	$ 100	$ 33,500
241.60	60 Inch Reinforced Concrete Pipe	1	LS	$ 30,000	$ 30,000
415.1	Pavement Milling	120	SY	$ 10	$ 1,200
460.	Hot Mix Asphalt	50	TON	$ 250	$ 12,500
748.	Mobilization	1	LS	$ 8,000	$ 8,000
850.	Maintenance of Traffic	1	LS	$ 30,000	$ 30,000
986.	Modified Rockfill	35	TON	$ 100	$ 3,500
991.1	Control of Water - Structure No. 1	1	LS	$ 20,000	$ 20,000
	Utility Allowance	1	LS	$ 50,000	$ 50,000
	Minor Item Allowance	1	LS	$ 25,000	$ 25,000
				Subtotal	$ 256,700
	Construction Contingency		20%		$ 52,000
	Material and Bidding Contingency		20%		$ 51,400
				Subtotal	$ 103,400
				TOTAL	**$ 360,100**
				SAY	**$ 365,000**

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Project Summary

Culvert ID	Summary Statistics [1]	Summary of Findings and Observations	Probability of Failure (PoF)	Consequence of Failure (CoF)	Criticality Rank	Recommendations	OPCC [2]
ColdSpring-2 Cold Spring Rd	Single barrel culvert Type: Corrugated metal pipe Diameter: 24” Road fill height: 4’ 6” Roadway width: 32’ Culvert length: 52’ Bankfull width – Field measured: 4.5’ StreamStats: 4.78’	• Critical condition of flared end sections at inlet and outlet • Poor headwall conditions at inlet and outlet • Poor invert deterioration at inlet • Outlet submerged • Located on an evacuation route • Water main crossing • Road closure would cause 3.9 mile detour	High PoF (0.1)	High CoF (0.38)	**High** (0.0)	Replacement Round Pipe Length: 40’ Diameter: 72”	$420,000 (see OPCC on next page)






[1] See the GIS data for a complete log of information gathered during field assessments.

[2] This is an engineer’s Opinion of Probable Construction Cost (OPCC). Tighe & Bond has no control over the cost or availability of labor, equipment or materials, or over market conditions or the Contractor’s method of pricing. The OPCC is made on the basis of Tighe & Bond’s professional judgment and experience. Tighe & Bond makes no guarantee nor warranty, expressed or implied, that the bids or the negotiated cost of the Work will not vary from this OPCC.

Tighe&Bond

April 2025

Planning Level Engineer's Opinion of Probable Cost

ColdSpring-2 (72" RCP, 50' Long) Culvert Replacement

Cold Spring Road

Town of Southampton, MA

ITEM	DESCRIPTION	QTY	UNITS	UNIT PRICE	AMOUNT
101.	Clearing and Grubbing	0.10	ACRE	$ 65,000	$ 6,500
116.1	Demolition of Existing Culvert	1	LS	$ 30,000	$ 30,000
140.1	Culvert Excavation	200	CY	$ 65	$ 13,000
151.	Gravel Borrow	510	CY	$ 100	$ 51,000
241.72	72 Inch Reinforced Concrete Pipe	1	LS	$ 40,000	$ 40,000
415.1	Pavement Milling	180	SY	$ 10	$ 1,800
460.	Hot Mix Asphalt	70	TON	$ 250	$ 17,500
748.	Mobilization	1	LS	$ 9,000	$ 9,000
850.	Maintenance of Traffic	1	LS	$ 30,000	$ 30,000
986.	Modified Rockfill	60	TON	$ 100	$ 6,000
991.1	Control of Water - Structure No. 1	1	LS	$ 20,000	$ 20,000
	Utility Allowance	1	LS	$ 50,000	$ 50,000
	Minor Item Allowance	1	LS	$ 25,000	$ 25,000
				Subtotal	$ 299,800
	Construction Contingency		20%		$ 60,000
	Material and Bidding Contingency		20%		$ 60,000
				Subtotal	$ 120,000
				TOTAL	**$ 419,800**
				SAY	**$ 420,000**

This is an engineer's Opinion of Probable Construction Cost (OPCC). Tighe & Bond has no control over the cost or availability of labor, equipment or materials, market conditions or the Contractor's method of pricing, and that the estimates of probable construction costs are made on the basis of the Tighe & Bond's professional judgment and experience. Tighe & Bond makes no guarantee nor warranty, expressed or implied, that the bids or the negotiated cost of the Work will not vary from this estimate of the Probable Construction Cost.