

019



# MESA PROJECT REVIEW CHECKLIST

Massachusetts Endangered Species Act M.G.L. c. 131A and Regulations (321 CMR 10.00)

Massachusetts Division of Fisheries & Wildlife  
Natural Heritage & Endangered Species Program

## ~~~~ CONTACT INFORMATION ~~~~

*If you already completed your Notice of Intent- Form 3, you can send page 1 of the NOI in place of questions 1 through 4 in this section*

**1. Project Location:**

|   |                    |          |
|---|--------------------|----------|
| Brook St/Nashoba Brook (Bridge #A-02-009) | Acton              | 01720    |
| Street Address/Location                   | City/Town          | Zip Code |
| Town Atlas Map E-4                        | N/A                |          |
| Assessors Map/Plat Number                 | Parcel /Lot Number |          |

**2. Applicant:**

|                 |                |                                 |
|-----------------|----------------|---------------------------------|
| Bruce           | Stamski        | Town of Acton Engineering Dept. |
| First Name      | Last Name      | Company                         |
| 472 Main Street |                |                                 |
| Mailing Address |                |                                 |
| Acton           | MA             | 01720                           |
| City/Town       | State          | Zip Code                        |
| (978) 264-9628  | (978) 264-9630 | Bstamski@acton-ma.gov           |
| Phone Number    | Fax Number     | Email address                   |

**3. Property owner (if different from applicant):**

|                 |                |                             |
|-----------------|----------------|-----------------------------|
| Steve           | Ledoux         | Town of Acton -Town Manager |
| First Name      | Last Name      | Company                     |
| 472 Main Street |                |                             |
| Mailing Address |                |                             |
| Acton           | MA             | 01720                       |
| City/Town       | State          | Zip Code                    |
| (978) 264-9612  | (978) 264-9630 | Sledoux@acton-ma.gov        |
| Phone Number    | Fax Number     | Email address               |

**4. Representative (if any):**

|                                      |                          |                    |
|--------------------------------------|--------------------------|--------------------|
| Town of Acton Engineering Department |                          |                    |
| Company                              |                          |                    |
| Corey                                | York                     |                    |
| Contact Person First Name            | Contact Person Last Name |                    |
| 472 Main Street                      |                          |                    |
| Mailing Address                      |                          |                    |
| Acton                                | MA                       | 01720              |
| City/Town                            | State                    | Zip Code           |
| (978) 264-9628                       | (978) 264-9630           | Cyork@acton-ma.gov |
| Phone Number                         | Fax Number               | Email address      |

~~~~ADDITIONAL INFORMATION ~~~~~

1. Will this project require a filing with the Conservation Commission and/or DEP?  No  Yes
2. Will this project meet any threshold for a MA Environmental Policy Act (MEPA) filing (excluding rare species, 301 CMR 11.03 (2))?  No  Yes
3. Has this project previously been issued a NHESP Tracking Number (either by previous NOI Submittal or MESA Information Request Form)?  No  Yes

If Yes - Tracking No. \_\_\_\_\_

~~~~PROJECT DESCRIPTION (attach separate sheet, as needed) ~~~~~

*Please note, certain projects or activities are exempt from review, see 321 CMR 10.14. The MESA does not allow project segmentation. Your filing must reflect all anticipated work associated with the proposed project (CMR 321 10.16).*

The Town of Acton is proposing to repair/rehab the existing bridge (#A-02-009) on Brook Street at the Nashoba Brook crossing to extend the structural capacity & upgrade the safety features of the bridge. The existing metal corrugated pipe arch will coated with a new protective coating. Also, voids between the headwalls and pipe arches shall be filled to prevent the infiltration of water behind the pipe arches. Lastly, the stone masonry bridge rail and headwalls shall be re-pointed to fill the large gaps in the mortar.

~~~~INCLUDE THE FOLLOWING INFORMATION ~~~~~

*The NHESP will notify the applicant within 30 days if the materials submitted do not satisfy requirements for a filing and request submission of any missing materials (321 CMR 10.18(1)).*

ALL Applicants must submit:

- USGS map (1:24,000 or 1:25,000) with property boundary clearly outlined
- Project plans for entire site (including wetland Resource Areas, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work)
- Assessor's map or right-of-way plan of site
- Project description
- Statement/proof that applicant is the Record Owner or that applicant is a person authorized in writing by the record owner to submit this filing
- Photographs representative of the site

Projects altering\* 10 or more acres, must also submit:

- A vegetation cover type map of the site
- Project plans showing Priority Habitat boundaries

The NHESP may request additional information, such as, but not limited to, species and habitat surveys, wetland reports, soil map and reports, and stormwater management reports (321 CMR 10.16).

\*Alteration: Any physical alteration of land, soils, drainage or destruction of plant life, see "Project or Activity" (321 CMR 10.02).

~~~~ FILING FEES ~~~~

See Fee Schedule below

a. Total MESA Fee Paid \$300.00    b. Acreage of Disturbance\* 0.01    c. Total Site Acreage 0.02

~~~~ REQUIRED SIGNATURES ~~~~

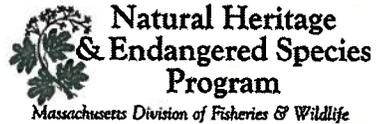
I hereby certify under the penalties of perjury that the foregoing MESA filing and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge.

 5/5/08  
 \_\_\_\_\_  
 Signature of Property Owner/Record Owner of Property Date

 5/5/08  
 \_\_\_\_\_  
 Signature of Applicant (required, if different from Owner) Date

**Please send form, required information, and filing fee (payable to "NHES Fund") to:**

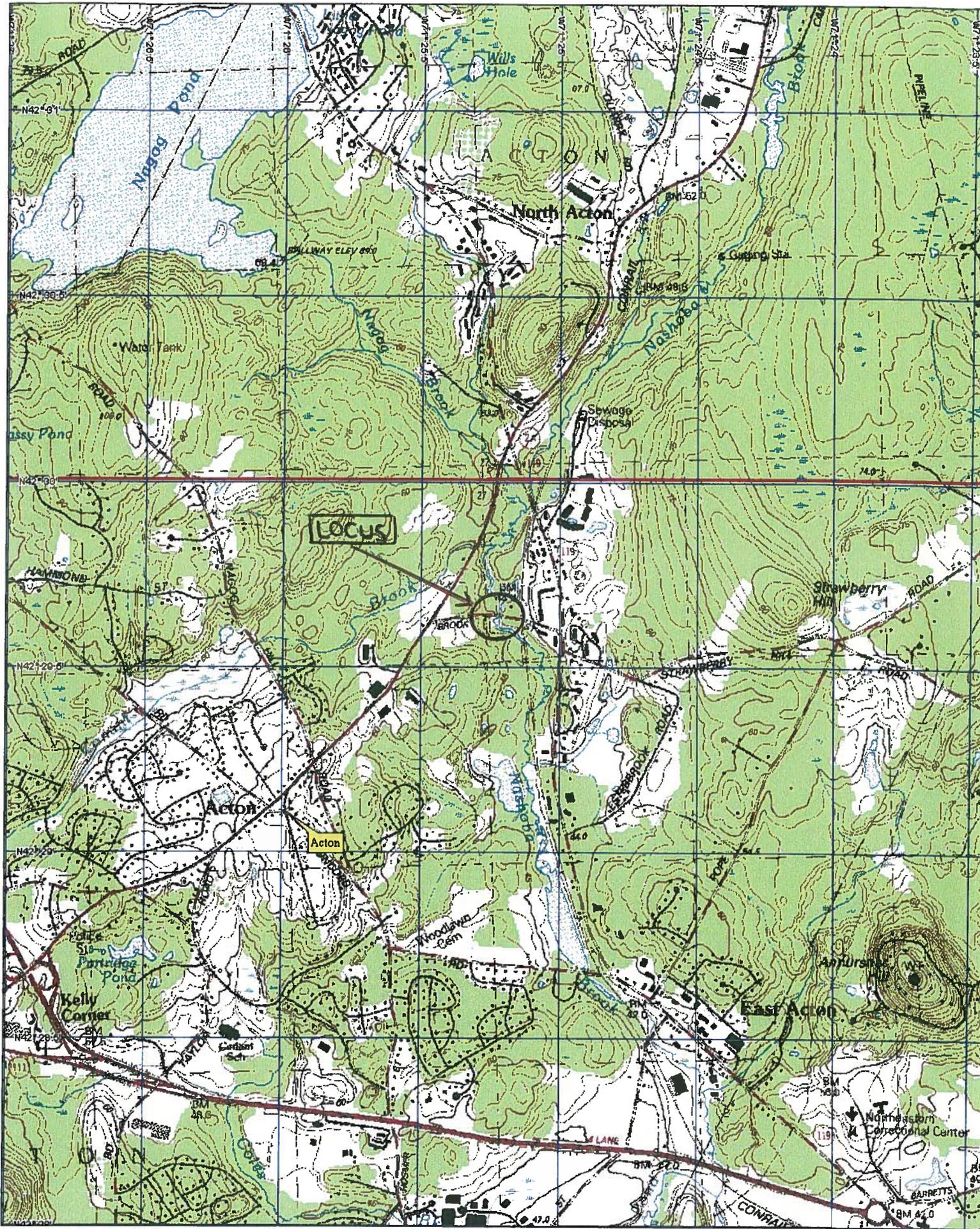
Regulatory Review  
 Natural Heritage & Endangered Species Program  
 1 Rabbit Hill Road  
 Westborough, MA 01581



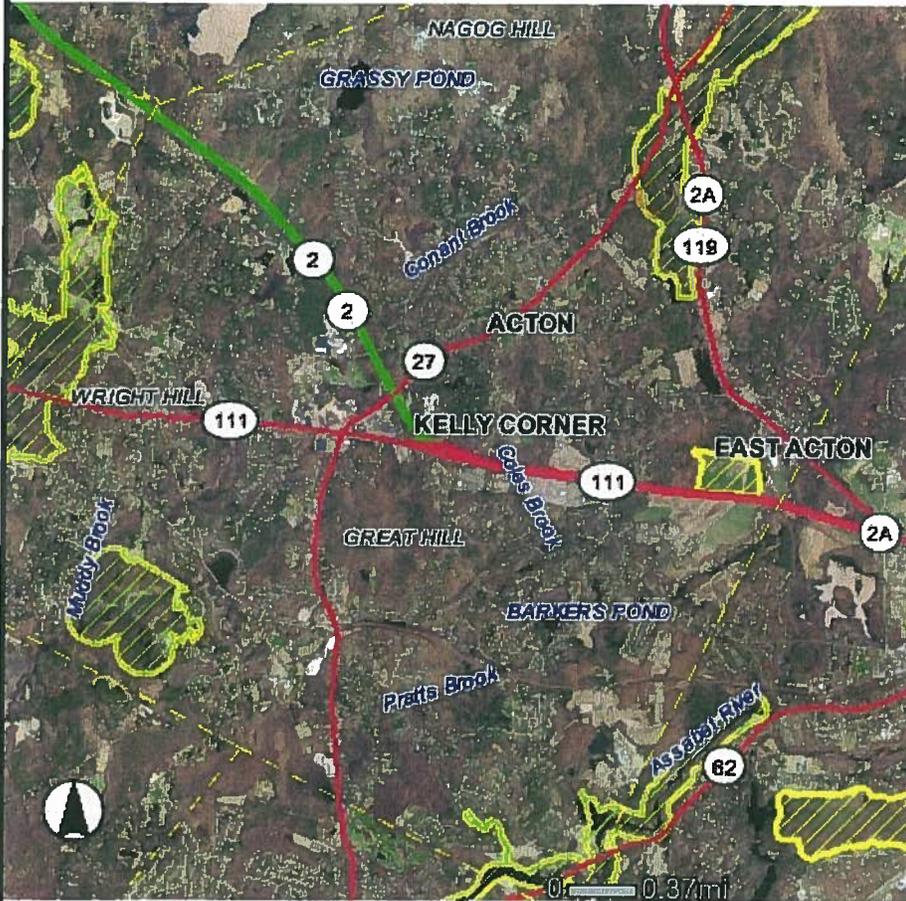
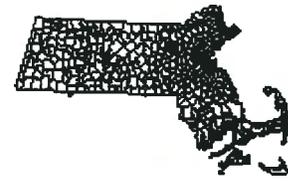
Telephone: 508-389-6380, FAX 508-389-7891

| PROJECT REVIEWS<br>321 CMR 10.18 (11) |                                                                          |                                             |                                               |
|---------------------------------------|--------------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------|
| Project Definition                    | Project Criteria                                                         | Fee                                         | Response Time                                 |
| Simple                                | Less than 5 acres of disturbance*                                        | \$ 300.00                                   | 60 days from determination of complete filing |
| Intermediate<br>(Moderate)            | 5 to 20 acres of disturbance*                                            | \$ 1800.00                                  | 60 days from determination of complete filing |
| Complex                               | More than 20 acres of disturbance* or project requires wetlands variance | \$ 4000.00                                  | 60 days from determination of complete filing |
| Linear                                | Projects greater than 1 mile in length.                                  | \$ 4000.00 per Priority Habitat intersected | 60 days from determination of complete filing |

\* Disturbance means direct physical disturbance of the land surface or waterbody, soil and/or vegetation, if only a portion of the project site is located within Priority Habitat, indicate total area of disturbance for site as a whole.



# 2006 Priority Habitat and Estimated Habitat Natural Heritage & Endangered Species Program



### Legend

Land Feature Names  
 Major EOT-OTP Roads  
 Alternate Route Numbers

#### Major EOT-OTP Roads

- Limited Access Highway
- Multi-lane Hwy, Not Limited Access
- Other Numbered Hwy

Place Names  
 Surrounding States Labels

- Surrounding States
- NHESP 2006 Priority Habitats of Rare Species and also Estimated Habitats of Rare Wildlife
- NHESP 2006 MA Priority Habitats of Rare Species

Color Orthos 2001  
 Color Orthos Islands 2003

Brook Street over Nashoba Brook – Bridge #A-02-009



October 31, 2007

# PHASE I- PRELIMINARY REPORT

## Town of Acton

### Summary of Conditions and Recommendations for the Repair/Rehabilitation of Town Owned Bridges



A-02-009



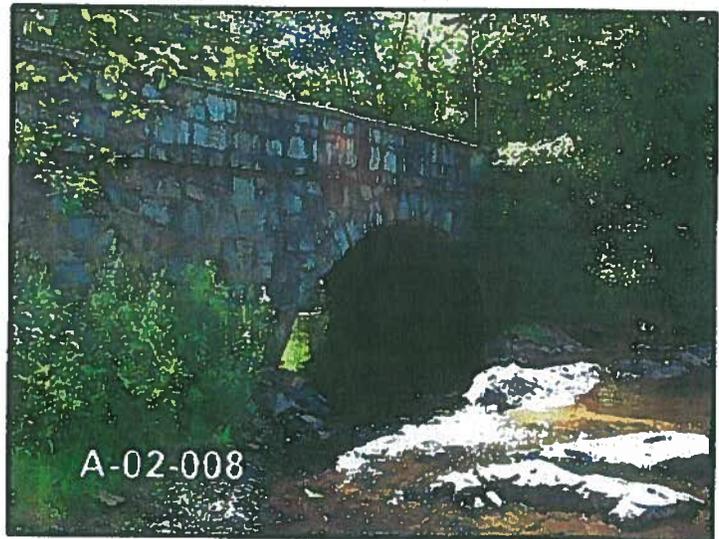
A-02-007



A-02-011



A-02-020



A-02-008

Submitted to:



Submitted by:



**CHAS. H. SELLS, INC.**

Consulting Engineers, Surveyors & Photogrammetrists

9 Trolley Crossing Road  
Charlton, MA 01507  
Tel: 508.248.1970  
Fax: 508.248.6072  
Web Site: [www.chashsells.com](http://www.chashsells.com)

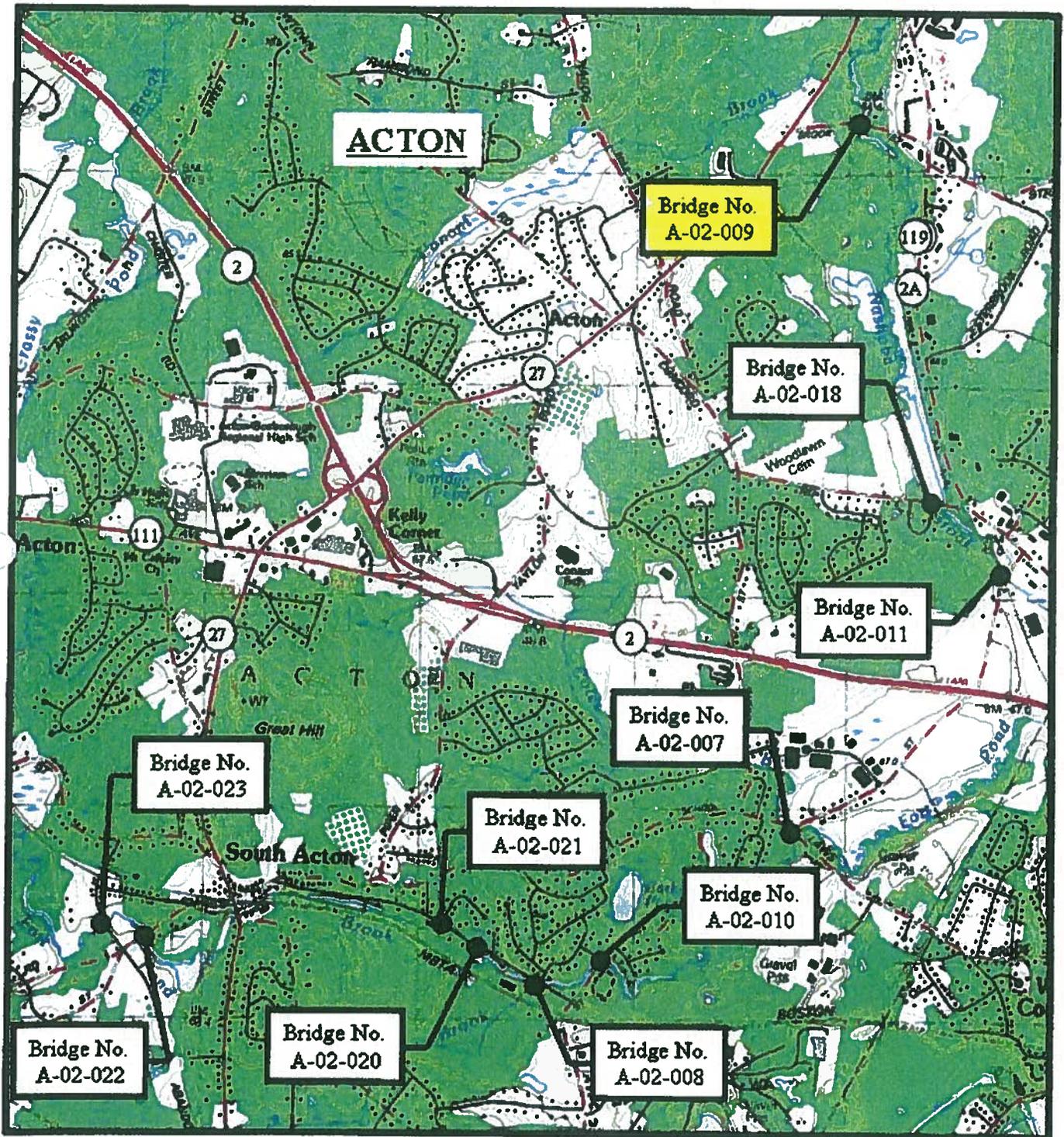


**TABLE OF CONTENTS**

|                                                                                                                                              |           |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>PROJECT LOCUS MAP</b>                                                                                                                     | <b>i</b>  |
| <b>I. EXECUTIVE SUMMARY</b>                                                                                                                  | <b>1</b>  |
| Background                                                                                                                                   |           |
| Proposed Project                                                                                                                             |           |
| Field Inspection                                                                                                                             |           |
| <b>II. BRIDGE DESCRIPTION AND ORIENTATION, SUMMARY OF EXISTING CONDITIONS, RECOMMENDED MAINTENANCE, BRIDGE SKETCHES AND PHOTOS BY BRIDGE</b> |           |
| Bridge No. A-02-007 (Lawsbrook Road over Fort Pond Brook)                                                                                    | 2         |
| Bridge No. A-02-008 (River Street over Fort Pond Brook at Carriage Drive)                                                                    | 6         |
| Bridge No. A-02-009 (Brook Street over Nashoba Brook)                                                                                        | 9         |
| Bridge No. A-02-010 (Parker Street over Fort Pond Brook)                                                                                     | 13        |
| Bridge No. A-02-011 (Wetherbee Street over Nashoba Brook)                                                                                    | 17        |
| Bridge No. A-02-018 (Concord Road over Nashoba Brook)                                                                                        | 20        |
| Bridge No. A-02-020 (River Street over Fort Pond Brook at Merriam Lane)                                                                      | 22        |
| Bridge No. A-02-021 (River Street over Fort Pond Brook at Vanderbilt Road)                                                                   | 25        |
| Bridge No. A-02-022 (Stow Street over Fort Pond Brook)                                                                                       | 28        |
| Bridge No. A-02-023 (Martin Street over Fort Pond Brook)                                                                                     | 32        |
| <b>III. RECOMMENDATIONS OF REPAIRS TO TOWN OWNED BRIDGES</b>                                                                                 | <b>35</b> |
| <b>IV. PRIORITY OF REPAIRS TO TOWN OWNED BRIDGES</b>                                                                                         | <b>36</b> |
| <b>V. RECOMMENDATION FOR WETLAND PERMITTING</b>                                                                                              | <b>37</b> |
| <b>VI. PRELIMINARY CONSTRUCTION COST ESTIMATE</b>                                                                                            | <b>38</b> |
| <b>APPENDIX A – Preliminary Engineer’s Construction Cost Estimate Summary Sheets</b>                                                         |           |
| <b>APPENDIX B – Current MassHighway Bridge Inspection Reports</b>                                                                            |           |

# ACTON

## Repair and Rehabilitation of Town Owned Bridges



### PROJECT LOCUS

Scale: 1:24000

## **I. EXECUTIVE SUMMARY**

### **Background**

The Town of Acton has requested Chas. H. Sells, Inc. (SELLS) to inspect and evaluate ten (10) Town Owned Bridges in the Town of Acton, MA. The bridges include Bridge No. A-02-018 (Concord Road over Nashoba Brook), Bridge No. A-02-011 (Wetherbee Street over Nashoba Brook), Bridge No. A-02-009 (Brook Street over Nashoba Brook), Bridge No. A-02-008 (River Street over Fort Pond Brook), Bridge No. A-02-021 (River Street over Fort Pond Brook), Bridge No. A-02-020 (River Street over Fort Pond Brook), Bridge No. A-02-023 (Martin Street over Fort Pond Brook), Bridge No. A-02-022 (Stow Street over Fort Pond Brook), Bridge No. A-02-007 (Lawsbrook Road over Fort Pond Brook) and Bridge No. A-02-010 (Parker Street over Fort Pond Brook). The purpose of this project is to develop and implement a maintenance/repair plan in order to extend their service life. The work shall consist of the inspection, evaluation, design and final preparation of construction drawings and documents necessary to complete the assigned project.

### **Proposed Project**

This project involves the inspection and evaluation of the above mentioned ten (10) bridges in the Town of Acton. The proposed bridges consist of two (2) corrugated steel pipe culvert structures, two (2) corrugated steel pipe arch culvert structures, two (2) corrugated steel deck arch structures, two (2) reinforced concrete box culvert structures, one (1) concrete encased steel beam superstructure and one (1) concrete "T" beam superstructure. This report summarizes the findings of SELLS field inspection and research. The report also identifies and prioritizes needed repairs to these structures and provides a preliminary cost estimate for these repairs.

### **Field Inspection**

The bridge structures were inspected between the dates of September 19 and 21, 2007 by Justin Downing and Keith Desroches of SELLS. The equipment used for these inspections included chest waders, hip waders, boat, chipping hammers and assorted measuring devices. The bridge structures were inspected with a hands-on inspection for their conformity with the most current MassHighway Department's Bridge Inspection Reports and to identify those elements that are in need of repair with the goal of extending the service life of these structures.

**BRIDGE NO. A-02-009 (BROOK STREET OVER NASHOBA BROOK)**
**Bridge Description and Orientation:**

The Brook Street Bridge over the Nashoba Brook is a twin corrugated steel pipe arch culvert that was built in 1938 (see Sketches & Photos #1 & #2). Brook Street, at the bridge, is oriented West and East over the Nashoba Brook which flows from North to South. The twin corrugated steel barrels are labeled West and East.

**Summary of Existing Conditions:**
**Bridge Rail & Approach Guardrail Deficiencies (NBIS Item #36 in Inspection Report)**

| Element            | Deficiency                                                                                                                                  | Reference Photo(s) |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Bridge Rail        | • Areas of missing mortar, separation of mortar, random voids and narrow to medium cracks in mortar                                         | 4                  |
|                    | • Wide crack in mortar in South bridge rail over West barrel that measures FH x up to 1"W, located approximately 12'-0" from the West end   |                    |
|                    | • West end of South bridge rail is settled several inches beginning at the crack over the West barrel                                       | 4                  |
|                    | • Wide crack in mortar in North bridge rail over West barrel that measures FH x up to 1/2 "W, located approximately 9'-0" from the West end |                    |
|                    | • Minor misalignment and minor cracked and/or missing mortar between granite cap stones                                                     |                    |
| Approach Guardrail | • Not attached to stone masonry bridge rail                                                                                                 |                    |

**Top of Bridge Deficiencies (NBIS Item #58 in Inspection Report):**

| Element         | Deficiency                                                        | Reference Photo(s) |
|-----------------|-------------------------------------------------------------------|--------------------|
| Wearing Surface | • Wide transverse crack at the West end of bridge                 | 3                  |
|                 | • Several medium to wide random cracks throughout                 |                    |
|                 | • Light to moderate vegetation growth along South side of roadway |                    |
|                 | • Heavy vegetation growth along North side                        |                    |

**Superstructure Deficiencies (NBIS Item #59 in Inspection Report)**

| Element                  | Deficiency                                                                                                                                                                                 | Reference Photo(s) |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Corrugated Steel Barrels | <ul style="list-style-type: none"> <li>• Light to moderate rusting along the waterline with minor steel delamination and heavier rusting at both ends of both barrels</li> </ul>           | 5                  |
|                          | <ul style="list-style-type: none"> <li>• Areas of peeling protective coating and peeling throughout</li> </ul>                                                                             | 6                  |
|                          | <ul style="list-style-type: none"> <li>• 100% section loss at East side of West barrel at South end that measures 9"H x 5" long</li> </ul>                                                 | 7                  |
|                          | <ul style="list-style-type: none"> <li>• 100% section loss at West side of West barrel at South end that measures 11"H x 4" long</li> </ul>                                                | 8                  |
|                          | <ul style="list-style-type: none"> <li>• Heavy aggradation at the upstream and downstream ends of both barrels</li> </ul>                                                                  |                    |
|                          | <ul style="list-style-type: none"> <li>• Light to moderate accumulation of sand and debris along the bottom of both barrels</li> </ul>                                                     |                    |
| North Headwall           | <ul style="list-style-type: none"> <li>• Numerous narrow to medium cracks and separation of mortar between stones, random hairline to narrow cracks and loose stones throughout</li> </ul> |                    |
|                          | <ul style="list-style-type: none"> <li>• Full height, jagged crack with separated stones above West barrel</li> </ul>                                                                      | 9                  |
|                          | <ul style="list-style-type: none"> <li>• Dislodged stones at upper West corner of East barrel and upper East corner of West barrel</li> </ul>                                              |                    |
|                          | <ul style="list-style-type: none"> <li>• Void at lower East face of West barrel that measures 20"H x 5"W x up to 18" penetration</li> </ul>                                                |                    |
|                          | <ul style="list-style-type: none"> <li>• Small voids along the East face of East barrel and West face of West barrel at North headwall</li> </ul>                                          | 10                 |
|                          | <ul style="list-style-type: none"> <li>• Voids along waterline between barrels at North headwall wall that measure full height x up to 3"H x up to 10" penetration</li> </ul>              |                    |
| South Headwall           | <ul style="list-style-type: none"> <li>• Full height, jagged crack with separated stones above West barrel</li> </ul>                                                                      | 1, 11              |
|                          | <ul style="list-style-type: none"> <li>• Void at West face of West barrel that measures 12"H x up to 3.5"W x up to 4.5" of penetration</li> </ul>                                          |                    |
|                          | <ul style="list-style-type: none"> <li>• Minor delamination of stones at upper East corner of East barrel</li> </ul>                                                                       |                    |
|                          | <ul style="list-style-type: none"> <li>• Void at East face of East barrel that measures 14"H x 2"W x 4" of penetration</li> </ul>                                                          |                    |
|                          | <ul style="list-style-type: none"> <li>• Void at West side of East barrel that measures 6"H x 2"W x up to 6" of penetration</li> </ul>                                                     | 1                  |
|                          | <ul style="list-style-type: none"> <li>• Small void between barrels adjacent to West barrel that measures 14"H x up to 6"W x 29" of penetration (at waterline)</li> </ul>                  | 1                  |



|  |                                                                                                                                                                                                                                                                                              |   |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  | <ul style="list-style-type: none"> <li>• Small void between barrels adjacent to West barrel that measures 7"H x 11"W x 19.5" of penetration (approximately 3'-0" from waterline)</li> <li>• Void at waterline between barrels that measures 15"H x 3"W x up to 25" of penetration</li> </ul> | 1 |
|  |                                                                                                                                                                                                                                                                                              | 1 |

**Abutment/Foundation Deficiencies (NBIS Item #60 in Inspection Report)**

| Element   | Deficiency                                                                                                                                                                                                                                                                                                                                                                                                                               | Reference Photo(s) |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Wingwalls | <ul style="list-style-type: none"> <li>• Mortared stone walls that show numerous hairline to narrow random cracks in mortar and minor separation between stones</li> <li>• Light vegetation growth at the Northwest wingwall and moderate to heavy vegetation growth at the Southwest and Southeast wingwalls</li> <li>• Retaining walls at Northeast and Northwest corners show minor voids and/or missing stones throughout</li> </ul> | 12                 |

**Recommended Maintenance:**

The following table outlines the deficiencies and repairs needed, along with the priority of the repair, to the Brook Street Bridge over Nashoba Brook:

| Element & Location                     | Deficiency                                  | Repair Needed                          | Priority |
|----------------------------------------|---------------------------------------------|----------------------------------------|----------|
| #1 Top of bridge                       | Light to heavy vegetation growth            | Remove vegetation growth               | Low      |
| #2 Wearing Surface                     | Random and transverse cracks                | Fill cracks with sealer                | Low      |
| #3 North and South bridge rail         | Hairline to narrow cracks in mortar         | Repoint stones as needed               | Low      |
| #4 Protective coating of steel barrels | Cracking and peeling throughout             | Clean and place new protective coating | High     |
| #5 South end of West barrel, West side | 100% Section loss                           | Remove deteriorated steel              | High     |
| #6 South end of West barrel, East side | 100% Section loss                           | Remove deteriorated steel              | High     |
| #7 North stone masonry headwall        | Full height, jagged crack above West barrel | Repoint stones as needed               | Low      |
| #8 North headwall around barrels       | Voids around barrels & along waterline      | Fill voids with concrete               | High     |
|                                        |                                             |                                        |          |

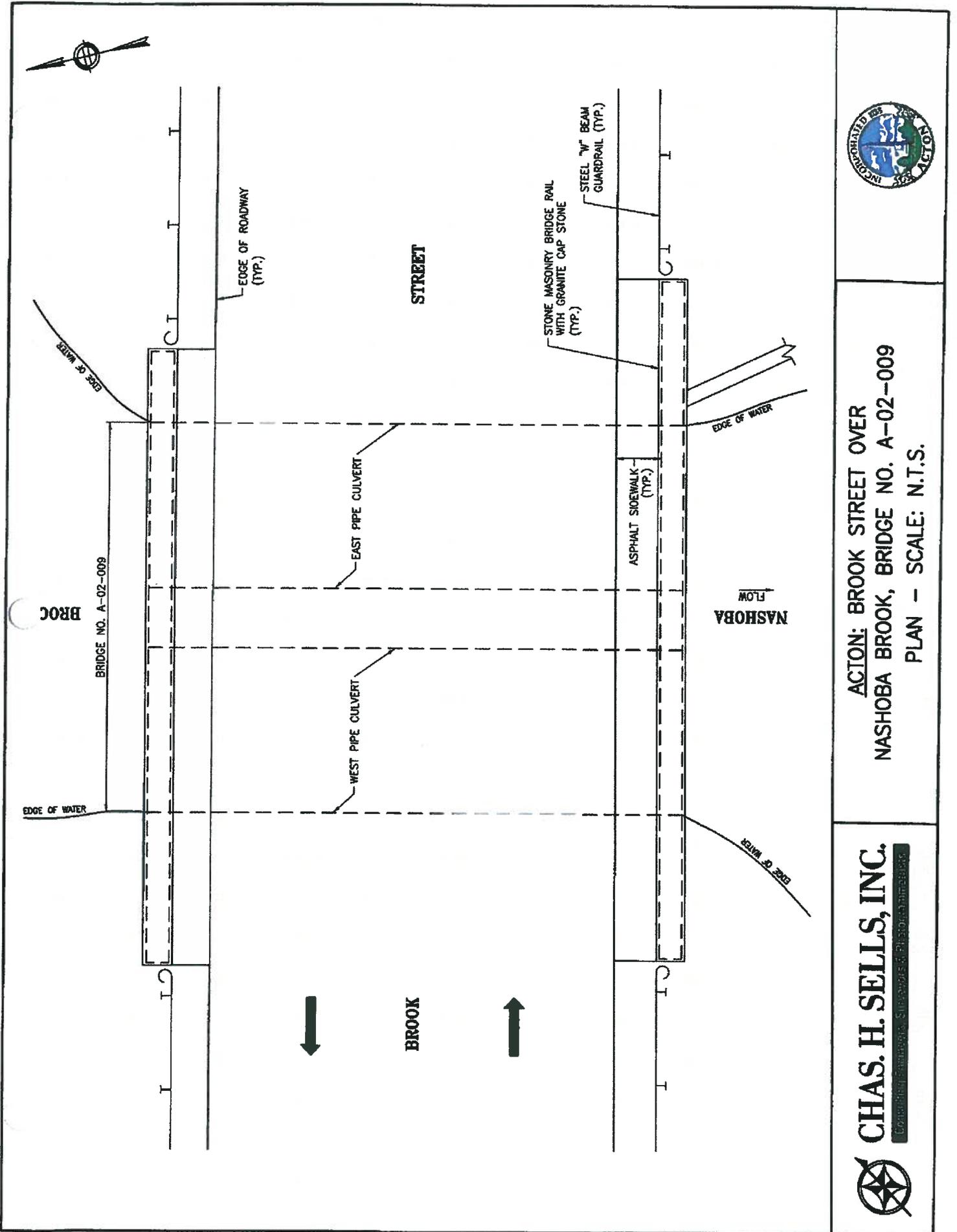


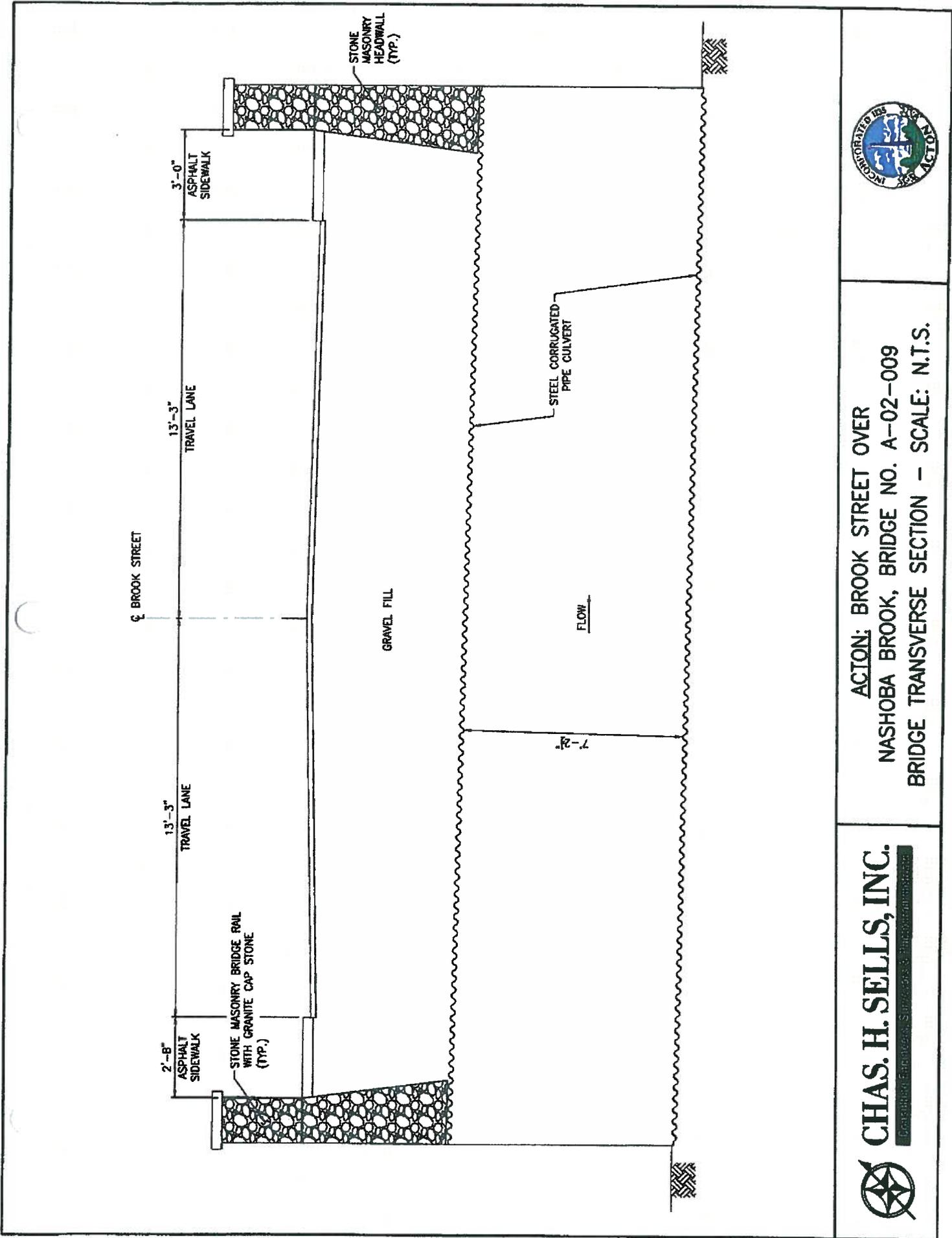
|     |                               |                                             |                                |          |
|-----|-------------------------------|---------------------------------------------|--------------------------------|----------|
| #9  | South stone masonry headwall  | Full height, jagged crack above West barrel | Repoint stones as needed       | Low      |
| #10 | South headwall around barrels | Voids                                       | Fill holes/voids with concrete | Moderate |
| #11 | Wingwalls                     | Hairline random cracks in mortar            | Repoint stones as needed       | Low      |



**ACTON: BROOK STREET OVER  
NASHOBA BROOK, BRIDGE NO. A-02-009  
PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
Consulting Engineers, Surveyors & Planners

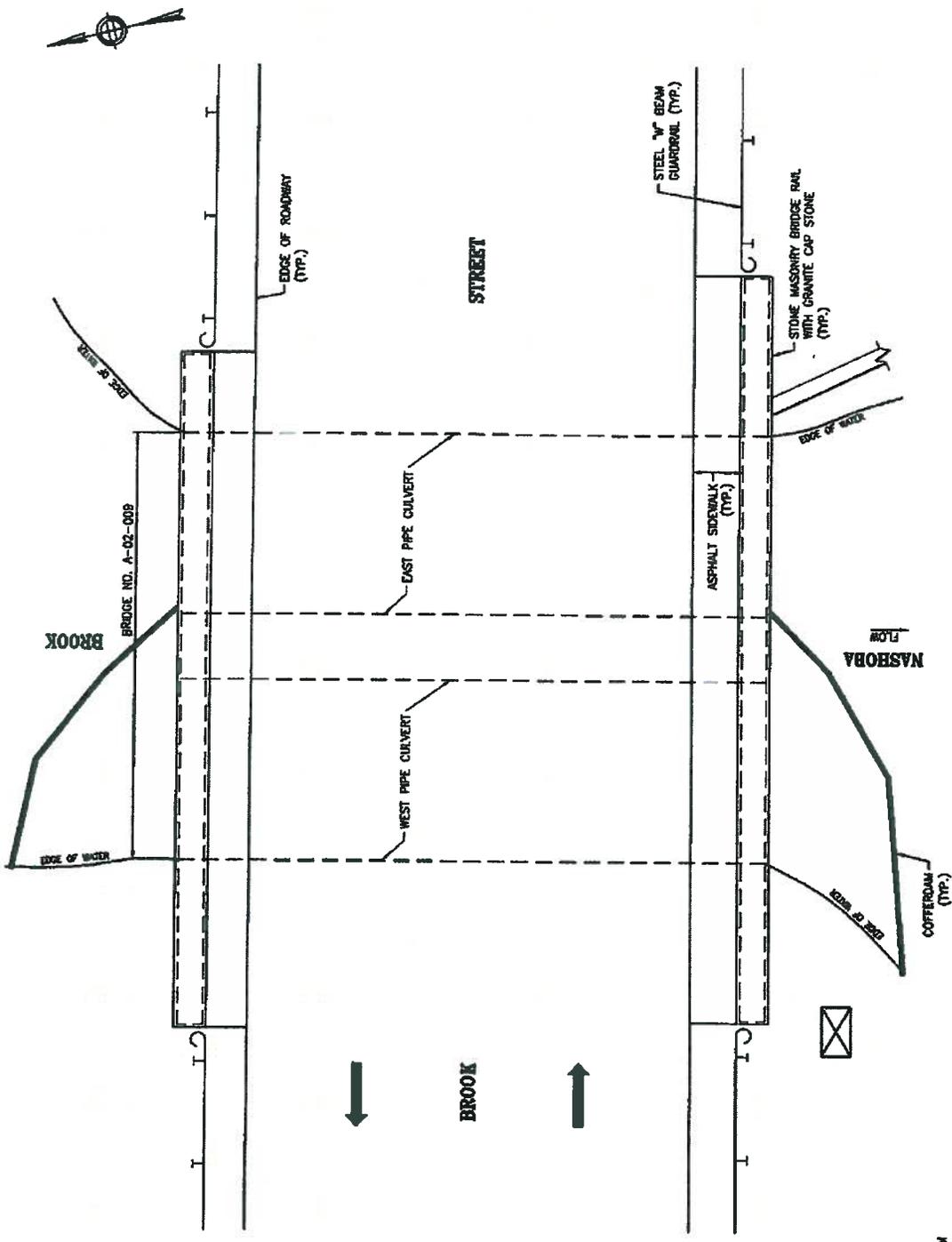




ACTION: BROOK STREET OVER  
 NASHOBA BROOK, BRIDGE NO. A-02-009  
 BRIDGE TRANSVERSE SECTION - SCALE: N.T.S.

**CHAS. H. SELLS, INC.**  
 CONSULTING ENGINEERS, ARCHITECTS & SURVEYORS





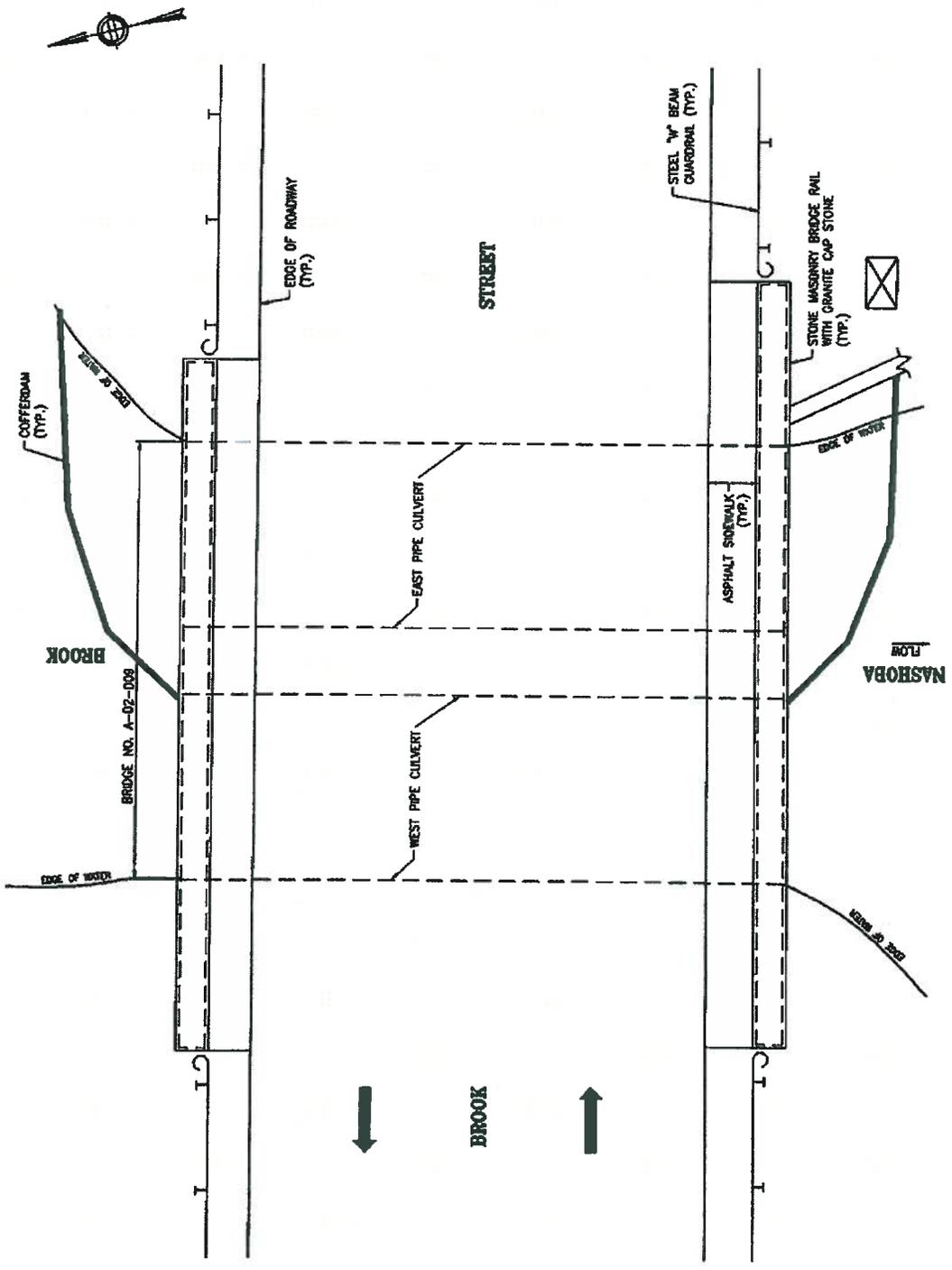
**LEGEND**  
 - - COFFEROAM  
 ⊠ - SEDIMENTATION BASIN

STAGE I

**CHAS. H. SELLS, INC.**  
 Longshore Engineers, Surveyors & Planners/Architects

**ACTION: BROOK STREET OVER  
 NASHOBA BROOK, BRIDGE NO. A-02-009  
 WATER CONTROL PLAN - SCALE: N.T.S.**





- LEGEND**
- COFFERDAM
  - - - SEDIMENTATION BASIN

STAGE II

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Geotechnical Engineers

**ACTION: BROOK STREET OVER  
 NASHOBA BROOK, BRIDGE NO. A-02-009  
 WATER CONTROL PLAN - SCALE: N.T.S.**



Bridge #: A-02-009

Photo #: 1

Full height jagged crack

Voids

09/20/2007

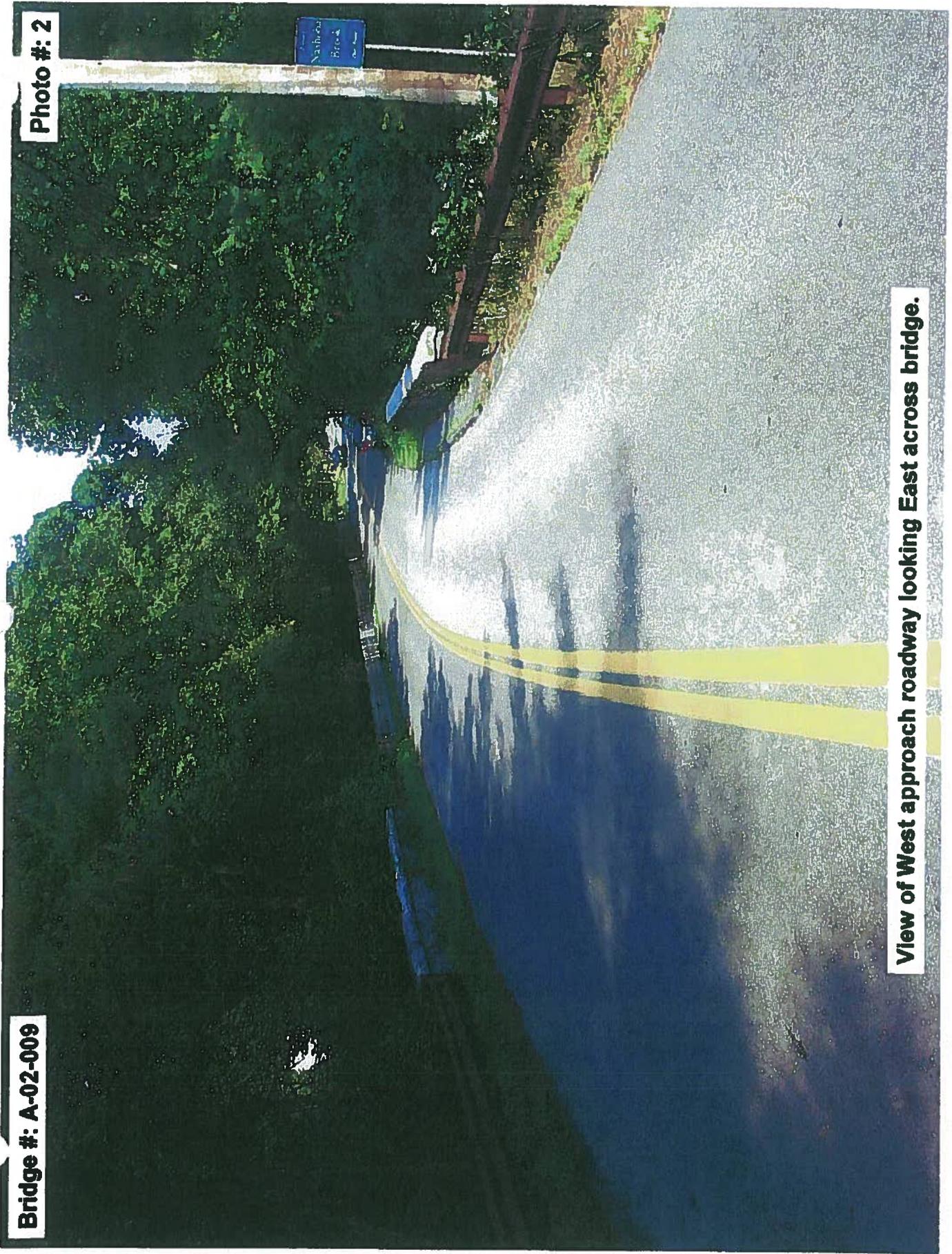
South Elevation View, looking North.



**Bridge #: A-02-009**

**Photo #: 2**

**View of West approach roadway looking East across bridge.**

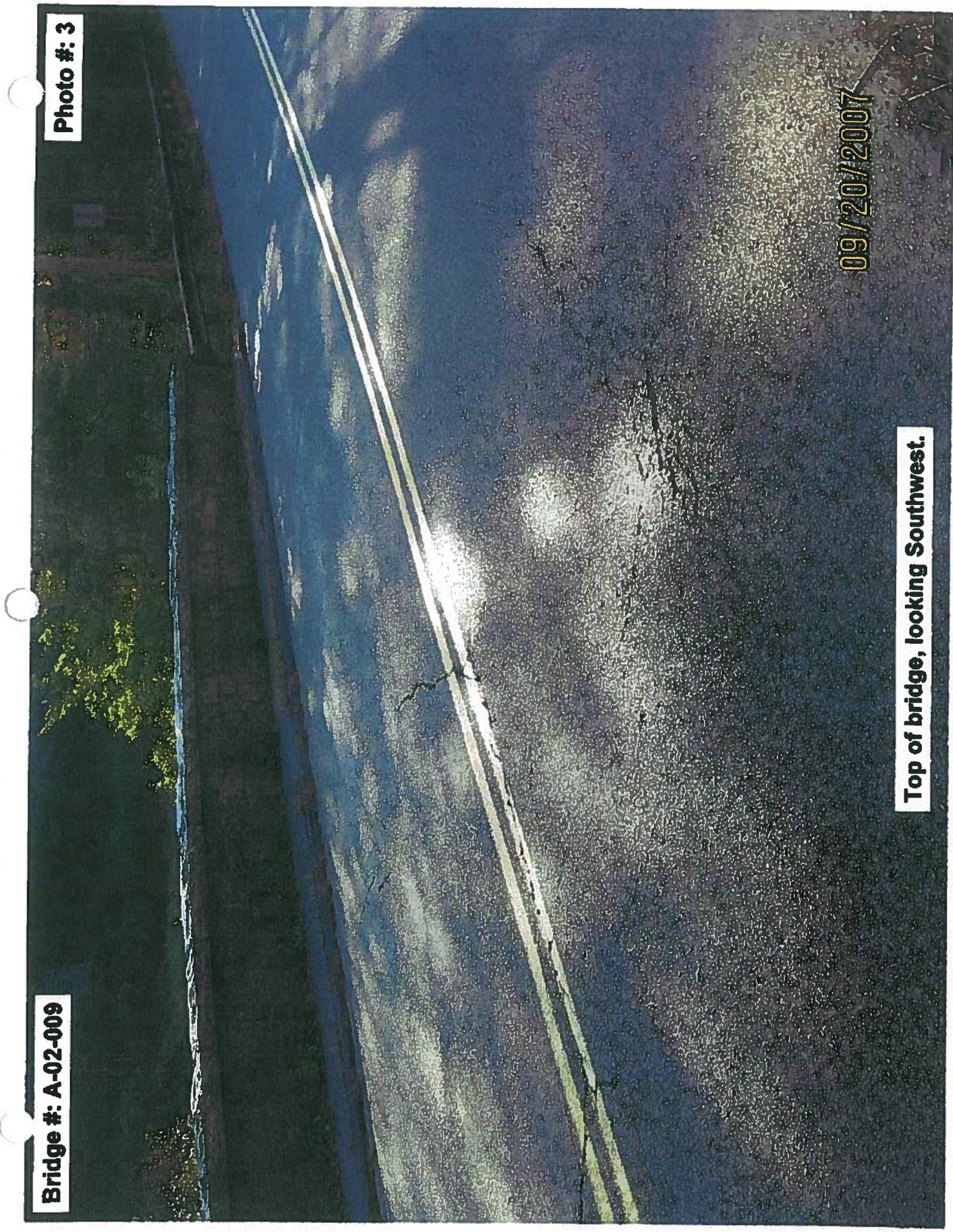


Bridge #: A-02-009

Photo #: 3

09/20/2007

Top of bridge, looking Southwest.



**Bridge #: A-02-009**

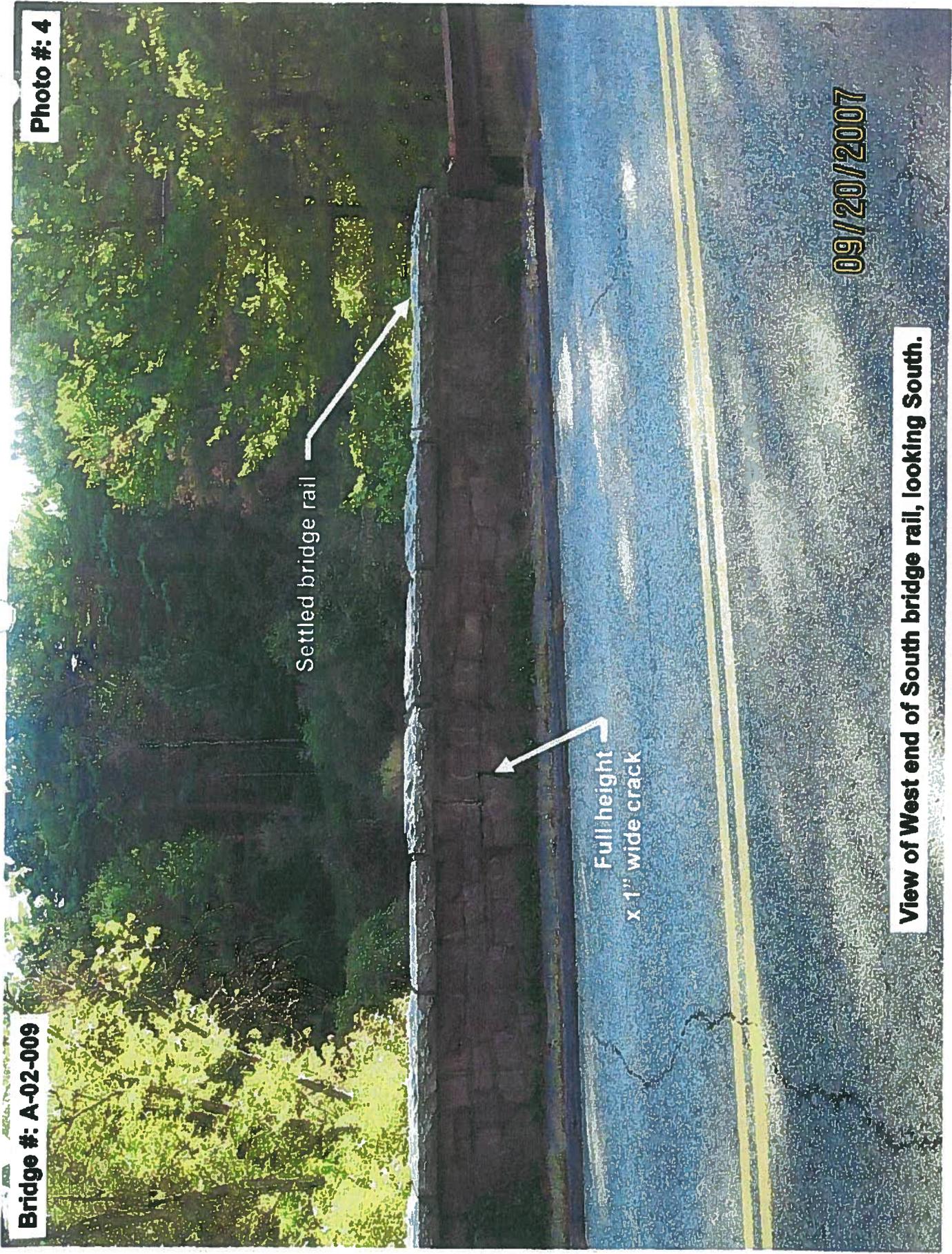
**Photo #: 4**

Settled bridge rail

Full height  
x 1" wide crack

**09/20/2007**

**View of West end of South bridge rail, looking South.**

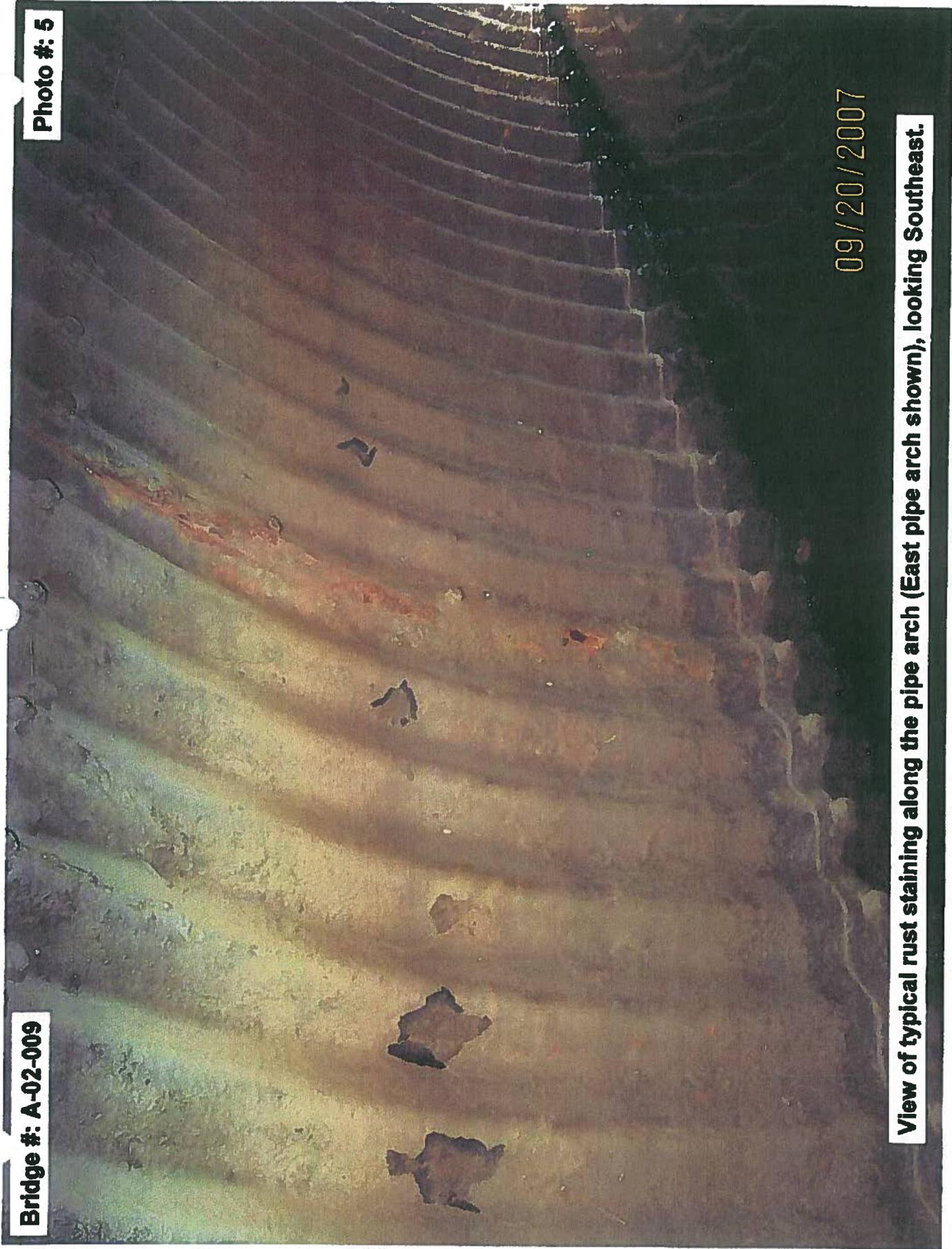


Bridge #: A-02-009

Photo #: 5

09/20/2007

View of typical rust staining along the pipe arch (East pipe arch shown), looking Southeast.



Bridge #: A-02-009

Photo #: 6

09/20/2007

View of typical peeling protective coat along the pipe arch (East pipe arch shown), looking East.



Bridge #: A-02-009

Photo #: 7

9" high x 5" long area  
of 100% section loss

09/20/2007

View of 100% section loss at the South end of the West pipe arch, looking East.



Bridge #: A-02-009

Photo #: 8

11" high x 4" long area  
of 100% section loss

09/20/2007

View of 100% section loss at the South end of the West pipe arch, looking West.



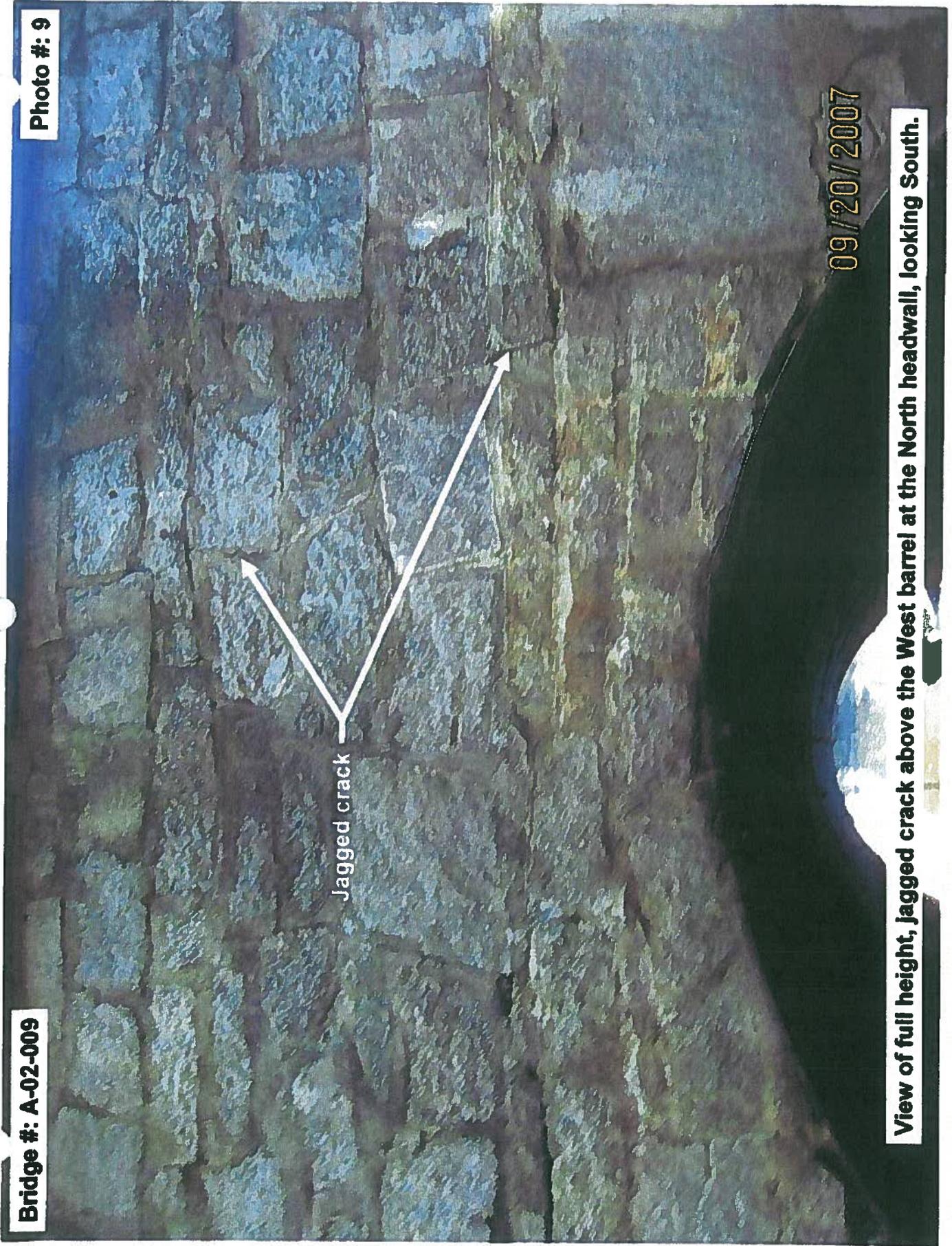
Bridge #: A-02-009

Photo #: 9

Jagged crack

09/20/2007

View of full height, jagged crack above the West barrel at the North headwall, looking South.



Bridge #: A-02-009

Photo #: 10

09/20/2007

View of voids along the waterline at the North closure wall, looking South.



**Bridge #: A-02-009**

**Photo #: 11**



**View of full height, jagged crack above the West barrel at the South headwall, looking North.**

Bridge #: A-02-009

Photo #: 12

09/20/2007

Typical condition of upstream retaining walls (Northwest wall shown), looking West.



STRUCTURES INSPECTION FIELD REPORT

2-DIST  
03

B.I.N.  
23Y

CULVERT INSPECTION

BR. DEPT. NO.  
A-02-009

|                                                       |  |                                               |                                     |                                                           |                                             |
|-------------------------------------------------------|--|-----------------------------------------------|-------------------------------------|-----------------------------------------------------------|---------------------------------------------|
| CITY/TOWN<br><b>ACTON</b>                             |  | 8-STRUCTURE NO.<br><b>A02009-23Y-MUN-NBI</b>  | 11-Kilo. POINT<br><b>000.354</b>    | 41-STATUS<br><b>A:OPEN</b>                                | 90-ROUTINE INSP. DATE<br><b>DEC 5, 2005</b> |
| 07-FACILITY CARRIED<br><b>HWY BROOK ST</b>            |  | MEMORIAL NAME/LOCAL NAME                      |                                     | 27-YR BUILT<br><b>1938</b>                                | 106-YR REBUILT<br><b>0000</b>               |
| 06-FEATURES INTERSECTED<br><b>WATER NASHOBA BROOK</b> |  | 26-FUNCTIONAL CLASS<br><b>Urban Collector</b> |                                     | DIST. BRIDGE INSPECTION ENGINEER<br><b>L. A. Gauthier</b> |                                             |
| 43-STRUCTURE TYPE<br><b>Steel Arch - Deck</b>         |  | 22-OWNER<br><b>Town Agency</b>                | 21-MAINTAINER<br><b>Town Agency</b> | TEAM LEADER<br><b>J. Read</b>                             | PROJ MGR<br><b>Transystems</b>              |
| 107-DECK TYPE<br><b>Not applicable</b>                |  | WEATHER<br><b>Cloudy</b>                      | TEMP. (air)<br><b>-5°C</b>          | TEAM MEMBERS<br><b>T. TAYLOR</b>                          |                                             |

|                                   |                                                     |                      |  |
|-----------------------------------|-----------------------------------------------------|----------------------|--|
| TYPE OF CULVERT:                  |                                                     | BARRELS: (In Meters) |  |
| SHAPE: <b>BARREL</b>              | SIZE: <b>3.30mx2.20m</b>                            | NUMBER: <b>2</b>     |  |
| MATERIAL: <b>CORRUGATED STEEL</b> | DEPTH OF COVER<br>(To the nearest tenth of a meter) |                      |  |
| COATING: <b>ASPHALTIC</b>         | N <b>0.6</b>                                        | S <b>0.6</b>         |  |
|                                   | CURB REVEAL<br>(In millimeters)                     |                      |  |
|                                   | <b>75</b>                                           | <b>75</b>            |  |

**ITEM 62 CULVERT & RETAINING WALLS**      **6**      162 (Dive Report): **6**      162 (This Report): **7**

|             |   |   |     |                       |   |   |     |                      |   |   |   |                                              |   |
|-------------|---|---|-----|-----------------------|---|---|-----|----------------------|---|---|---|----------------------------------------------|---|
| 1. Roof     | N | 7 | -   | 7. Protective Coating | 7 | 7 | -   | 13. Member Alignment | N | 7 | - | UNDERMINING (Y/N) If YES please explain      | N |
| 2. Floor    | 7 | 7 | -   | 8. Embankment         | 7 | 7 | -   | 14. Deformation      | 8 | 7 | - |                                              |   |
| 3. Walls    | N | 7 | -   | 9. Wearing Surface    | N | 7 | -   | 15. Scour            | 7 | 7 | - | COLLISION DAMAGE: <i>Please explain</i>      |   |
| 4. Headwall | 6 | 6 | M-P | 10. Railing           | N | 6 | M-P | 16. Settlement       | 7 | 7 | - | None ( X ) Minor ( ) Moderate ( ) Severe ( ) |   |
| 5. Wingwall | N | 7 | -   | 11. Sidewalks         | N | 6 | M-P | 17.                  |   |   |   | LOAD VIBRATION: <i>Please explain</i>        |   |
| 6. Pipe     | 7 | 7 | -   | 12. Utilities         | N | N | -   | 18.                  |   |   |   | None ( X ) Minor ( ) Moderate ( ) Severe ( ) |   |

**ITEM 61 CHANNEL & CHANNEL PROTECTION**      **7**

|                       |   |   |   |                            |   |   |   |                                                                    |                    |
|-----------------------|---|---|---|----------------------------|---|---|---|--------------------------------------------------------------------|--------------------|
| 1. Channel Scour      | 7 | 7 | - | 5. Utilities               | N | N | - | STREAM FLOW VELOCITY:<br>Tidal ( ) High ( ) Moderate ( ) Low ( X ) | APPROACH CONDITION |
| 2. Embankment Erosion | 7 | 7 | - | 6. Rip-Rap/Slope Protector | 7 | N | - |                                                                    |                    |
| 3. Debris             | 7 | 7 | - | 7. Aggradation             | 8 | 7 | - | ITEM 61 (Dive Report): <b>7</b>                                    |                    |
| 4. Vegetation         | 7 | 7 | - |                            |   |   |   | ITEM 61 (This Report): <b>7</b>                                    |                    |
|                       |   |   |   |                            |   |   |   | 93b-<br>U/W INSP DATE: <b>08/11/2004</b>                           |                    |

|                              |   |   |
|------------------------------|---|---|
| a. Appr. pavement condition  | 7 | - |
| b. Appr. Roadway Settlement  | 7 | - |
| c. Appr. Sidewalk Settlement | N | - |
| d.                           |   |   |

**WEIGHT POSTING**

Actual Posting:  Not Applicable

|   |   |     |        |
|---|---|-----|--------|
| H | 3 | 393 | Single |
| N | N | N   | N      |
| N | N | N   | N      |

Recommended Posting:

Waved Date: **00/00/00**      EJDMT Date: **12/17/1987**

Signs in Place (Y=Yes, N=No, NR=Not Required)  
Legibility/Visibility

|                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|
| At bridge                |                          | Advance                  |                          |
| E                        | W                        | E                        | W                        |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**ITEM 36 TRAFFIC SAFETY**

|                            |   |   |     |
|----------------------------|---|---|-----|
| A. Bridge Railing          | 0 | 6 | M-P |
| B. Transitions             | 0 | 0 | -   |
| C. Approach Guardrail      | 1 | 7 | -   |
| D. Approach Guardrail Ends | 1 | 7 | -   |

**ACCESSIBILITY (Y/N/P):**

|        |   |   |        |   |   |
|--------|---|---|--------|---|---|
| Ladder | N | N | Other: |   |   |
| Boat   | N | N |        | N | N |
| Waders | Y | Y |        |   |   |

**TOTAL HOURS**      **4**

**PLANS (Y/N):**      **N**

**(V.C.R.) (Y/N):**      **N**

**TAPE#:** \_\_\_\_\_

**RATING**

Request for Rating or Rerating (Y/N)      **N**      If YES please give priority:

Rating Report (Y/N)      **Y**      HIGH ( ) MEDIUM ( ) LOW ( )

Date: **12/01/1987**      REASON: \_\_\_\_\_

X=UNKNOWN      N=NOT APPLICABLE      H=HIDDEN/INACCESSIBLE      R=REMOVED

|                    |               |                           |                                        |                                |
|--------------------|---------------|---------------------------|----------------------------------------|--------------------------------|
| CITY/TOWN<br>ACTON | B.I.N.<br>23Y | BR. DEPT. NO.<br>A-02-009 | 8.-STRUCTURE NO.<br>A02009-23Y-MUN-NBI | INSPECTION DATE<br>DEC 5, 2006 |
|--------------------|---------------|---------------------------|----------------------------------------|--------------------------------|

## REMARKS, PHOTOS &amp; SKETCHES

**BRIDGE ORIENTATION**

Brook Street travels east and west over the Nashoba Brook which flows from north to south. The culvert barrels are numbered from west to east.

**GENERAL REMARKS**

There was a 1 in. snowfall on the night before the inspection which obscured the condition of the top of capstone and the sidewalk. Spot areas were cleaned off and inspected and based on these small areas the condition ratings from the previous report were continued to this report.

**ITEM 62 - CULVERT****Item 62.4 - Headwall**

The north headwall has two areas where the mortar between the masonry blocks is missing. The first area is located at 10:00 o'clock facing south on culvert 1 and measures 26 in. wide and 26 in. tall. The second is at 2:00 o'clock facing south on culvert 2 and measures 24 in. wide and 40 in. tall. The voids in these two areas were up to 1 ft. deep. (See Photo 3.) There is a hairline to narrow crack in the mortar joints between the stones located in the center between the culverts extending vertically from the cap stone to the first area mentioned above. There is an area with efflorescence staining extending from the west headwall end to above the center of culvert 1 from the street level down.

The south headwall has an area of masonry blocks with missing mortar located at 2:30 o'clock facing north on culvert 1. The voids in this area were measured to be up to 9 in. deep. There is another area of missing mortar between the masonry blocks located at 2:30 o'clock facing south on culvert 2. The voids in this area

## CONDITION RATING GUIDE

| CODE | CONDITION            | DEFECTS                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N    | NOT APPLICABLE       | Use if structure is not a culvert.                                                                                                                                                                                                                                                                                                                                                                                                         |
| G    | 9 EXCELLENT          | No deficiencies.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| G    | 8 VERY GOOD          | No noticeable or noteworthy differences which affect the condition of the culvert. Insignificant scrape marks caused by drift.                                                                                                                                                                                                                                                                                                             |
| G    | 7 GOOD               | Shrinkage cracks, light scaling, and insignificant spalling, which does not expose reinforcing steel. Insignificant damage caused by drift with not misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls, or pipes. Metal culverts have a smooth symmetrical curvature with superficial corrosion and no pitting.                                                              |
| F    | 6 SATISFACTORY       | Deterioration or initial disintegration, minor chloride contamination, cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls, or pipes. Metal culverts have a smooth curvature, non-symmetrical shape, significant corrosion or moderate pitting.                                                                                                                |
| F    | 5 FAIR               | Moderate to major deterioration, or disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection in one section, significant corrosion or deep pitting.                                                                            |
| P    | 4 POOR               | Large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joints permitting loss of backfill. Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection throughout, extensive corrosion or deep pitting.                                                                               |
| P    | 3 SERIOUS            | Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slabs. Integral wingwalls, nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls, or pipes. Metal culverts have extreme distortion and deflection in one section, extensive corrosion, or deep pitting with scattered perforations. |
| C    | 2 CRITICAL           | Advance deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.                                                                                                                                                                |
| C    | 1 "IMMINENT" FAILURE | Bridge closed. Corrective action may put back in light service.                                                                                                                                                                                                                                                                                                                                                                            |
| 0    | FAILED               | Bridge closed. Replacement necessary.                                                                                                                                                                                                                                                                                                                                                                                                      |

## DEFICIENCY REPORTING GUIDE

**DEFICIENCY:** A defect in a structure that requires corrective action.

**CATEGORIES OF DEFICIENCIES:**

**M= Minor Deficiency** - (Examples include but are not limited to: Spalled concrete, minor to moderate corrosion to steel culverts, minor settlement or misalignment, minor scouring, minor damage to guardrail, etc.)

**S= Severe/Major Deficiency** - (Examples include but are not limited to: Large spalls, wide cracks, moderate to major deterioration in concrete, considerable settlement, considerable scouring or undermining, extensive corrosion and deflection in steel culverts, etc.)

**C-S= Critical Deficiency** - A deficiency in a structural component or element of a bridge that poses an extreme hazard or unsafe condition to the public. (Follow-up Critical Deficiency Report must be submitted separately)

**URGENCY OF REPAIR:**

**I = Immediate** - [Inspector(s) stay at the bridge until the District Maintenance crew or the responsible Agency crew (if not a State bridge) show up and corrective action is taken.]

**A = ASAP** - [Action will be taken by the District Maintenance Engineer or the Responsible Agency (if not a State owned bridge) upon receipt of the Inspection Report].

**P = Prioritize** - [Shall be prioritized by District Maintenance Engineer or the Responsible Party (if not a State owned bridge) and repairs made when funds and/or manpower is available].

|                           |                      |                                  |                                               |                                       |
|---------------------------|----------------------|----------------------------------|-----------------------------------------------|---------------------------------------|
| CITY/TOWN<br><b>ACTON</b> | B.I.N.<br><b>23Y</b> | BR. DEPT. NO.<br><b>A-02-009</b> | 8.-STRUCTURE NO.<br><b>A02009-23Y-MUN-NBI</b> | INSPECTION DATE<br><b>DEC 5, 2005</b> |
|---------------------------|----------------------|----------------------------------|-----------------------------------------------|---------------------------------------|

### REMARKS

**Item 62.4 - Headwall (Cont'd)**

were measured to be up to 30 in. deep. There are areas of hairline surface efflorescence in the mortar joints below the street surface in the south headwall primarily on the east side of culvert 2. There is a wide crack in the mortar joints located above culvert 1 and extending vertically from the cap stone to the keystone area. (See Photo 4.)

**Item 62.6 - Pipe**

The asphalt coating is cracked and the steel is rusting in a few spot locations above the waterline and there is rusting at the water level. There are spot locations of delaminating rust in both culverts at the ends just above the waterline.

**Item 62.7 - Protective Coating**

See Item 62.6 Pipe.

**Item 62.9 - Wearing Surface**

The wearing surface has moderate transverse and longitudinal wide cracking primarily in the eastbound travel lane.

**Item 62.10 - Railing**

The north and south bridge rails are made up of random laid up stone mortar with a stone cap. The mortar condition is good. Both have vertical and horizontal cracks in the mortar joints. The cracks are typically 1/8 to 1/4 in. in width. (See Photo 1.) The south bridge rail has a 1 in. wide crack located 16 ft. east of the west end. (See Photo 2.) No through cracks in stones were observed adjacent to or part of the vertical or horizontal cracks. The cap stone in each quadrant is losing mortar at the ends of the headwalls. Some of the cap stone joints are open.

**TRAFFIC SAFETY**

**Item 36b - Transitions**

There are no transitions.

**Photo Log**

- Photo 1: Northeast bridge rail.
- Photo 2: South bridge rail center span.
- Photo 3: North headwall.
- Photo 4: South end of culvert 1.

|                           |                      |                                  |                                               |                                       |
|---------------------------|----------------------|----------------------------------|-----------------------------------------------|---------------------------------------|
| CITY/TOWN<br><b>ACTON</b> | B.I.N.<br><b>23Y</b> | BR. DEPT. NO.<br><b>A-02-009</b> | 8.-STRUCTURE NO.<br><b>A02009-23Y-MUN-NBI</b> | INSPECTION DATE<br><b>DEC 5, 2005</b> |
|---------------------------|----------------------|----------------------------------|-----------------------------------------------|---------------------------------------|

**PHOTOS**



**Photo 1: Northeast bridge rail.**



**Photo 2: South bridge rail center span.**

|                    |               |                           |                                        |                                |
|--------------------|---------------|---------------------------|----------------------------------------|--------------------------------|
| CITY/TOWN<br>ACTON | B.I.N.<br>23Y | BR. DEPT. NO.<br>A-02-009 | 8.-STRUCTURE NO.<br>A02009-23Y-MUN-NBI | INSPECTION DATE<br>DEC 5, 2005 |
|--------------------|---------------|---------------------------|----------------------------------------|--------------------------------|

PHOTOS



Photo 3: North headwall.



Photo 4: South end of culvert 1.

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**UNDERWATER OPERATIONS TEAM**  
**ROUTINE UNDERWATER INSPECTION REPORT**

2-DIST  
**03**

B.I.N.  
**23Y**

BR. DEPT. NO.  
**A-02-009**

|                                                       |  |                                              |                                        |                                                          |                                           |
|-------------------------------------------------------|--|----------------------------------------------|----------------------------------------|----------------------------------------------------------|-------------------------------------------|
| CITY/TOWN<br><b>ACTON</b>                             |  | 8-STRUCTURE NO.<br><b>A02009-23Y-MUN-NBI</b> |                                        | LEVEL OF INSPECTION<br><b>II</b>                         | 93B-DATE INSPECTED<br><b>APR 25, 2007</b> |
| 07-FACILITY CARRIED<br><b>HWY BROOK ST</b>            |  | ACCESS TO BRIDGE<br><b>EMBANKMENT</b>        |                                        | UNDERWATER OPERATIONS ENGINEER<br><b>JOHN B. DESMOND</b> |                                           |
| 06-FEATURES INTERSECTED<br><b>WATER NASHOBA BROOK</b> |  | DEPTH<br><b>1.3 m</b>                        | VISIBILITY<br><b>1 m</b>               | TEAM LEADER (DIVE MASTER)<br><b>SHARON A. BEGLEY</b>     | Report submitted by:                      |
| BOTTOM CONDITION<br><b>GRAVEL</b>                     |  | CURRENT<br><b>MODERATE</b>                   | TEAM MEMBERS<br><b>E. P. TERNO SKY</b> |                                                          |                                           |

| ITEM 60                  |   | <b>N</b> | ITEM 61                      | <b>7</b> | ITEM 62               | <b>6</b>       |   |
|--------------------------|---|----------|------------------------------|----------|-----------------------|----------------|---|
| SUBSTRUCTURE             |   | DEF      | CHANNEL & CHANNEL PROTECTION | DEF      | CULVERTS              | DEF            |   |
| 1. Abutments             | N | -        | 1. Channel Scour             | 7        | 1. Roof               | N              |   |
| a. Pedestals             | N | -        | 2. Embankment Erosion        | 7        | 2. Floor              | 7              |   |
| b. Bridge Seats          | N | -        | 3. Debris                    | 7        | 3. Weils              | N              |   |
| c. Backwalls             | N | -        | 4. Vegetation                | 7        | 4. Headwall           | 6              |   |
| d. Breastwalls           | N | -        | 5. Utilities                 | N        | 5. Wingwall           | N              |   |
| e. Wingwalls             | N | -        | 6. Rip-Rap/Slope Protection  | H        | 6. Pipe               | 7              |   |
| f. Slope Paving/Rip-Rap  | N | -        | 7. Aggradation               | 8        | 7. Protective Coating | 7              |   |
| g. Pointing              | N | -        | 8. Fender System             | N        | 8. Embankment         | 7              |   |
| h. Footings              | N | -        | a. Piles                     | N        | 9. Wearing Surface    | N              |   |
| i. Piles                 | N | -        | b. Diagonal Bracing          | N        | 10. Railing           | N              |   |
| j. Scour                 | N | -        | c. Horizontal Bracing        | N        | 11. Sidewalks         | N              |   |
| k. Settlement            | N | -        | d. Weils                     | N        | 12. Utilities         | N              |   |
| l.                       | N | -        | e. Fasteners                 | N        | 13. Member Alignment  | N              |   |
| 2. Piers or Bents        | N | -        | f. Ladders                   | N        | 14. Deformation       | 8              |   |
| a. Pedestals             | N | -        | g.                           | N        | 15. Scour             | 7              |   |
| b. Caps                  | N | -        | ITEM 59 SUPERSTRUCTURE       |          |                       | 16. Settlement | 7 |
| c. Columns               | N | -        |                              | N        | 17.                   | N              |   |
| d. Stems/Weils/Pierwalls | N | -        |                              | N        | 18.                   | N              |   |
| e. Pointing              | N | -        |                              | N        | UNDERMINING (Y/N)     |                |   |
| f. Footing               | N | -        |                              | -        |                       | N              |   |
| g. Piles                 | N | -        |                              | -        |                       |                |   |
| h. Scour                 | N | -        |                              | -        |                       |                |   |
| i. Settlement            | N | -        |                              | -        |                       |                |   |
| j.                       | N | -        |                              | -        |                       |                |   |
| k.                       | N | -        |                              | -        |                       |                |   |
| 3. Pile Bents            | N | -        |                              | -        |                       |                |   |
| a. Pile Caps             | N | -        |                              | -        |                       |                |   |
| b. Piles                 | N | -        |                              | -        |                       |                |   |
| c. Diagonal Bracing      | N | -        |                              | -        |                       |                |   |
| d. Horizontal Bracing    | N | -        |                              | -        |                       |                |   |
| e. Fasteners             | N | -        |                              | -        |                       |                |   |

**DEFICIENCY REPORTING GUIDE**

**DEFICIENCY:** A defect in a structure that requires corrective action.

**CATEGORIES OF DEFICIENCIES:**

**M= Minor Deficiency-** Deficiencies which are minor in nature, generally do not impact the structural integrity of the bridge and could easily be repaired. Examples include but are not limited to: Spalled concrete, Minor scouring, etc.

**S= Severe/Major Deficiency-** Deficiencies which are more extensive in nature and need more planning and effort to repair. Examples include but are not limited to: Moderate to major deterioration in concrete, Exposed and corroding rebars, Deteriorated timber piles, Considerable settlement, Considerable scouring or undermining, etc.

**C-S= Critical Structural Deficiency-** A deficiency in a structural element of a bridge that poses an extreme unsafe condition due to the failure or imminent failure of the element which will affect the structural integrity of the bridge.

**C-H= Critical Hazard Deficiency-** A deficiency in a component or element of a bridge that poses an extreme hazard or unsafe condition to the public, but does not impair the structural integrity of the bridge. Examples include but are not limited to: Any part of piles or fender system which are projecting outward and may become a safety hazard for the navigational traffic, etc.

**URGENCY OF REPAIR:**

**I=Immediate-** [Inspector(s) immediately contact District Bridge Inspection Engineer (DBIE) to report the Deficiency and to receive further instruction from him/her.]

**A=ASAP-** [Action/Repair should be initiated by District Maintenance Engineer or the responsible party (if not a State owned bridge) upon receipt of the Inspection Report.]

**P=Prioritize-** [Shall be prioritized by District Maintenance Engineer or the Responsible Party (if not a State owned bridge) and repairs made when funds and/or manpower is available.]

X=UNKNOWN      N=NOT APPLICABLE      H=HIDDEN/INACCESSIBLE      R=REMOVED

|                           |                      |                                  |                                               |                                        |
|---------------------------|----------------------|----------------------------------|-----------------------------------------------|----------------------------------------|
| CITY/TOWN<br><b>ACTON</b> | B.I.N.<br><b>23Y</b> | BR. DEPT. NO.<br><b>A-02-009</b> | 8.-STRUCTURE NO.<br><b>A02009-23Y-MUN-NBI</b> | INSPECTION DATE<br><b>APR 25, 2007</b> |
|---------------------------|----------------------|----------------------------------|-----------------------------------------------|----------------------------------------|

### REMARKS

#### GENERAL REMARKS

- 1) Orientation - Abutments are labeled left and right when facing downstream.
- 2) Sta 10+00 is at the upstream end.
- 3) This structure is a double barrel ACCM culvert.

#### ITEM 61 - CHANNEL AND CHANNEL PROTECTION

##### Item 61.6 - Rip-Rap/Slope Protection

There is a small retaining wall located at upstream right with several voids from missing stones.

#### ITEM 62 - CULVERT

##### Item 62.2 - Floor

Floors consist of two layers, one each of concrete and bituminous and were mostly visible with small amounts of gravel covering.

##### Item 62.4 - Headwall

Headwall is dry laid below waterline with random missing chinking stones and small voids. See sketch.

##### Item 62.6 - Pipe

Twin ACCM pipes are in generally good condition with several small areas of minor corrosion where coating has deteriorated away .

##### Item 62.7 - Protective Coating

There are several small areas where coating has deteriorated away exposing metal pipes.

##### Item 62.15 - Scour

The river bed covers the invert of the pipe ends resulting in no exposure. There are several voids between pipes and walls at each end. See sketch for locations and dimensions.

#### Sketch / Chart Log

Sketch 1 : PLAN VIEW

Chart 1 : SCOUR MONITORING

CITY/TOWN  
ACTON

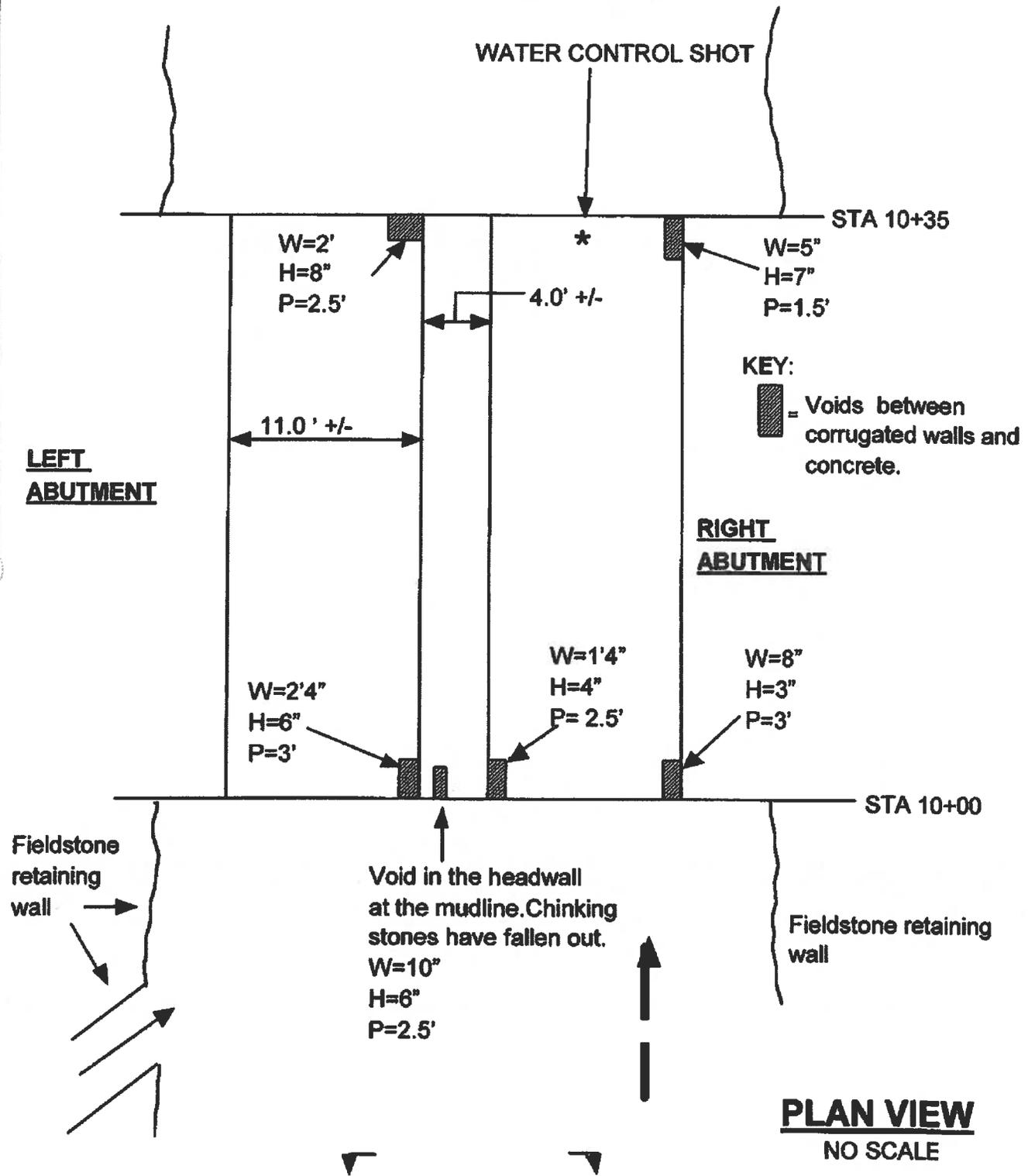
B.I.N.  
23Y

BR. DEPT. NO.  
A-02-009

8.-STRUCTURE NO.  
A02009-23Y-MUN-NBI

INSPECTION DATE  
APR 25, 2007

SKETCHES



Sketch 1: PLAN VIEW

|                           |                      |                                  |                                               |                                        |
|---------------------------|----------------------|----------------------------------|-----------------------------------------------|----------------------------------------|
| CITY/TOWN<br><b>ACTON</b> | B.I.N.<br><b>23Y</b> | BR. DEPT. NO.<br><b>A-02-009</b> | 8.-STRUCTURE NO.<br><b>A02009-23Y-MUN-NBI</b> | INSPECTION DATE<br><b>APR 25, 2007</b> |
|---------------------------|----------------------|----------------------------------|-----------------------------------------------|----------------------------------------|

## CHARTS

### SCOUR MONITORING CHART

| OFFSETS                         | 6/22/95 | 7/28/98 | 7/5/01 | 6/11/04 | 4/25/07 |  |
|---------------------------------|---------|---------|--------|---------|---------|--|
| UPSTREAM LEFT CENTER OF SPAN    | 2.0     | 2.0     | 2.0    | 2.1     | 2.1     |  |
| UPSTREAM RIGHT CENTER OF SPAN   | 1.8     | 2.0     | 2.0    | 1.9     | 1.9     |  |
| DOWNSTREAM RIGHT CENTER OF SPAN | 2.0     | 1.8     |        |         |         |  |
| DOWNSTREAM LEFT CENTER OF SPAN  | 1.2     | 1.5     |        |         |         |  |
|                                 |         |         |        |         |         |  |
| Y                               | 4.5     | 4.4     | 2.3    | 3.4     | 2.8     |  |
| CORRECTION                      | -       | -0.1    | -2.2   | -1.1    | -1.7    |  |

#### Notes

1. All soundings and measurements in english.
2. Water control shot (Y) = Waterline to apex of downstream right pipe.
3. For comparison all soundings are adjusted to 1995 water level.
4. Station 1+00 is located at the upstream end.

Chart 1: SCOUR MONITORING

Report Date: October 23, 2007

| State Information                                           |  |                                       |  | Classification                                        |  |                             |  |
|-------------------------------------------------------------|--|---------------------------------------|--|-------------------------------------------------------|--|-----------------------------|--|
| BDEPT#= A02009                                              |  | Agency Br.No.                         |  | (112) NBIS Bridge Length                              |  | Code                        |  |
| Town= Acton                                                 |  |                                       |  | (104) Highway System                                  |  | Y                           |  |
| B.I.N= 23Y                                                  |  | AASHTO= 079.2                         |  | (28) Functional Class - Urban Collector               |  | N                           |  |
|                                                             |  | FHWA Select List= Y                   |  | (100) Defense Highway                                 |  | 17                          |  |
| Structure Number                                            |  | A0200923YMUNNBI                       |  | (101) Parallel Structure                              |  | 0                           |  |
| (5) Inventory Route                                         |  | 181000000                             |  | (102) Direction of Traffic - 2-way traffic            |  | N                           |  |
| (2) State Highway Department District                       |  | 03                                    |  | (103) Temporary Structure                             |  | 2                           |  |
| (3) County Code 017 (4) Place code                          |  | 00360                                 |  | (105) Federal Lands Highways                          |  | N                           |  |
| (6) Features Intersected                                    |  | WATER NASHOBA BROOK                   |  | (110) Designated National Network                     |  | 0                           |  |
| (7) Facility Carried                                        |  | HWY BROOK ST                          |  | (20) Toll - On free road                              |  | N                           |  |
| (9) Location                                                |  | .25 MI. W OF RTE. 2A                  |  | (21) Maintain - Town Agency                           |  | 3                           |  |
| (11) Kilometerpoint                                         |  | 0000.354                              |  | (22) Owner - Town Agency                              |  | 03                          |  |
| (12) Base Highway Network                                   |  | N                                     |  | (37) Historical Significance undetermined             |  | 03                          |  |
| (13) LRS Inventory Route & Subroute                         |  | 000000000000                          |  |                                                       |  |                             |  |
| (18) Latitude                                               |  | 42 DEG 29 MIN 36.34 SEC               |  | Condition                                             |  | Code                        |  |
| (17) Longitude                                              |  | 71 DEG 25 MIN 15.25 SEC               |  | (56) Deck                                             |  | N                           |  |
| (66) Border Bridge State Code                               |  | Share %                               |  | (59) Superstructure                                   |  | N                           |  |
| (69) Border Bridge Structure No. #                          |  |                                       |  | (60) Substructure                                     |  | N                           |  |
|                                                             |  |                                       |  | (61) Channel & Channel Protection                     |  | 7                           |  |
|                                                             |  |                                       |  | (62) Culverts                                         |  | 6                           |  |
| Structure Type and Material                                 |  |                                       |  | Load Rating and Posting                               |  |                             |  |
| (43) Structure Type Main: Steel                             |  | Code 319                              |  | (31) Design Load - Other/Unknown                      |  | Code                        |  |
| Culvert                                                     |  | Jointless bridge type: Not applicable |  | (63) Operating Rating Method - Allowable Stress (AS)  |  | 0                           |  |
| (44) Structure Type Appr. Other                             |  | Code 000                              |  | (64) Operating Rating                                 |  | 2                           |  |
| (45) Number of spans in main unit                           |  | 002                                   |  | (65) Inventory Rating Method - Allowable Stress (AS)  |  | 44.1                        |  |
| (48) Number of approach spans                               |  | 0000                                  |  | (66) Inventory Rating                                 |  | 2                           |  |
| (107) Deck Structure Type - Not applicable                  |  | Code N                                |  | (70) Bridge Posting                                   |  | 32.4                        |  |
| (108) Wearing Surface / Protective System:                  |  |                                       |  | (41) Structure - Open                                 |  | 5                           |  |
| A) Type of wearing surface - Not applicable=no deck         |  | Code N                                |  | Appraisal                                             |  | Code                        |  |
| B) Type of membrane - Not applicable=no deck                |  | Code N                                |  | (87) Structural Evaluation                            |  | 6                           |  |
| Type of deck protection - Not applicable=no deck            |  | Code N                                |  | (86) Deck Geometry                                    |  | 2                           |  |
|                                                             |  |                                       |  | (68) Underclearance, vert. and horiz.                 |  | N                           |  |
|                                                             |  |                                       |  | (71) Waterway adequacy                                |  | 7                           |  |
|                                                             |  |                                       |  | (72) Approach Roadway Alignment                       |  | 7                           |  |
|                                                             |  |                                       |  | (38) Traffic Safety Features                          |  | 0 0 1 1                     |  |
|                                                             |  |                                       |  | (113) Scour Critical Bridges                          |  | 8                           |  |
| Age and Service                                             |  |                                       |  | Inspections                                           |  |                             |  |
| (27) Year Built                                             |  | 1936                                  |  | (90) Inspection Date 12/05/05                         |  | (91) Frequency 24 MO        |  |
| (106) Year Reconstructed                                    |  | 0000                                  |  | (92) Critical Feature Inspection:                     |  | (93) CFI DATE               |  |
| (42) Type of Service: On - Highway-Pad                      |  |                                       |  | (A) Fracture Critical Detail                          |  | N 00 MO A) 00/00/00         |  |
| Under - Waterway                                            |  | Code 55                               |  | (B) Underwater Inspection                             |  | Y 36 MO B) 04/25/07         |  |
| (28) Lanes: On Structure 02                                 |  | Under structure 00                    |  | (C) Other Special Inspection                          |  | N 00 MO C) 00/00/00         |  |
| (29) Average Daily Traffic                                  |  | 006500                                |  | (*) Other Inspection ()                               |  | N 00 MO *) 00/00/00         |  |
| (30) Year of ADT 2005 (109) Truck ADT                       |  | 06 %                                  |  | (*) Closed Bridge                                     |  | N 00 MO *) 00/00/00         |  |
| (19) Bypass, detour length                                  |  | 002 KM                                |  | (*) U/W Special Inspection                            |  | N 00 MO *) 00/00/00         |  |
| Geometric Data                                              |  |                                       |  | Rating Loads                                          |  |                             |  |
| (46) Length of maximum span                                 |  | 0003.4 M                              |  | Report Date 12/01/87                                  |  | H20 Type 3 Type 3S2 Type HS |  |
| (49) Structure Length                                       |  | 00007.9 M                             |  | Operating                                             |  | 27.0 34.0 49.0 49.0         |  |
| (50) Curb or sidewalk: Left 00.7 M Right 00.9 M             |  |                                       |  | Inventory                                             |  | 20.0 25.0 36.0 36.0         |  |
| (51) Bridge Roadway Width Curb to Curb                      |  | 008.2 M                               |  | Field Posting                                         |  |                             |  |
| (52) Deck Width Out to Out                                  |  | 010.9 M                               |  | Status EJD MNT                                        |  | Posting Date 12/17/87       |  |
| (32) Approach Roadway Width (w/shoulders)                   |  | 007.9 M                               |  | Actual 2 Axle                                         |  | 3 Axle 5 Axle               |  |
| (33) Bridge Median - No median                              |  | Code 0                                |  | Recommended                                           |  |                             |  |
| (34) Skew 00 DEG (35) Structure Flared                      |  | N                                     |  | Missing Signs N                                       |  |                             |  |
| (10) Inventory Route MIN Vert Clear                         |  | 99.99 M                               |  | Misc.                                                 |  |                             |  |
| (47) Inventory Route Total Horiz Clear                      |  | 06.2 M                                |  | Bridge Name                                           |  |                             |  |
| (53) Min Vert Clear Over Bridge Rdwy                        |  | 99.99 M                               |  | N Anti-missile fence N Acrow Panel N Jointless Bridge |  |                             |  |
| (54) Min Vert Underclear ref                                |  | N 00.00 M                             |  | Freeze/Thaw N : Not Applicable                        |  |                             |  |
| (55) Min Lat Underclear RT ref                              |  | N 00.0 M                              |  | Accessibility (Needed/Used)                           |  |                             |  |
| (56) Min Lat Underclear LT                                  |  | 00.0 M                                |  | N / N Liftbucket N / N Rigging Inspection             |  |                             |  |
| Navigation Data                                             |  |                                       |  | N / N Ladder N / N Staging Hours: 004                 |  |                             |  |
| (39) Navigation Control - No navigation control on waterway |  | Code 0                                |  | N / N Boat N / N Traffic Control                      |  |                             |  |
| River Protection                                            |  | Code                                  |  | Y / Y Wader N / N RR Flagperson                       |  |                             |  |
| (118) Vert-lift Bridge Nav Min Vert Clear                   |  | M                                     |  | N / N Inspector 50 N / N Police                       |  |                             |  |
| (40) Navigation Horizontal Clearance                        |  | 0000.0 M                              |  |                                                       |  |                             |  |

### **III. RECOMMENDATIONS OF REPAIRS TO TOWN OWNED BRIDGES**

The following is a list, by bridge, of repairs that SELLS recommends to be immediate priorities. These repairs are all associated with extending the long term structural capacity and/or upgrading significantly substandard safety features.

#### **Bridge No. A-02-007 (Lawsbrook Road over Fort Pond Brook)**

SELLS recommends that the current steel W-beam guardrail/bridge rail be replaced in its entirety with a Modified Thrie Beam Bridge Rail and repairs be done to the concrete safety curbs. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately \$44,000.

#### **Bridge No. A-02-008 (River Street over Fort Pond Brook at Carriage Drive)**

SELLS recommends that the corrugated steel deck arch and lower connection plates be cleaned and coated with a new protective coating, particularly at the lower ends where the steel plate meets the concrete abutments. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately \$41,000.

#### **Bridge No. A-02-009 (Brook Street over Nashoba Brook)**

SELLS recommends that the steel corrugated pipe arch culverts be cleaned and coated with a new protective coating. Also, voids between the headwalls and pipe arches shall be filled to prevent the infiltration of water behind the pipe arches. Lastly, the stone masonry bridge rail and headwalls shall be repointed to fill the large gaps in the mortar. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately \$92,000.

#### **Bridge No. A-02-010 (Parker Street over Fort Pond Brook)**

SELLS recommends that the current steel W-beam guardrail/bridge rail be replaced in its entirety with a Modified Thrie Beam Bridge Rail and the steel corrugated deck arch and lower connection plates be cleaned and coated with a new protective coating, particularly at the lower ends where the steel plate meets the concrete abutments. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately \$87,000.

#### **Bridge No. A-02-011 (Wetherbee Street over Nashoba Brook)**

SELLS recommends that no work be done to this bridge at this time. The repairs that are recommended to be done to this structure would provide minimal benefits at this time. The Town should continue to monitor MassHighway Bridge Inspection Reports for changes to the bridge's condition.

**Bridge No. A-02-018 (Concord Road over Nashoba Brook)**

SELLS recommends that no work be done to this bridge at this time. The repairs that are recommended to be done to this structure would provide minimal benefits at this time. The Town should continue to monitor MassHighway Bridge Inspection Reports for changes to the bridge's condition.

Repairs are needed to the channel walls downstream from the bridge. As previously mentioned, these walls may be beyond the Town's Right of Way (owned by others.) Therefore, there may be a question as to whether the Town is responsible for maintenance of these walls.

**Bridge No. A-02-020 (River Street over Fort Pond Brook at Merriam Lane)**

SELLS recommends that the steel corrugated pipe culverts be cleaned and coated with a new protective coating. Also, voids between the headwalls and pipe arches shall be filled to prevent the infiltration of water behind the pipe arches. Riprap shall also be placed at the culvert ends to prevent undermining. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately \$100,000.

**Bridge No. A-02-021 (River Street over Fort Pond Brook at Vanderbilt Road)**

SELLS recommends that the steel corrugated pipe arch culverts be cleaned and coated with a new protective coating. Also, voids between the headwalls and pipe arches shall be filled to prevent the infiltration of water behind the pipe arches. Riprap shall also be placed at the culvert ends to prevent undermining and the failed section of the Southwest wingwall should be rebuilt. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately \$74,000.

**Bridge No. A-02-022 (Stow Street over Fort Pond Brook)**

SELLS recommends that the remaining concrete be removed from the bottom portion of the concrete encased steel beams and repairs be done to the faces of both abutments and both faces of the pierwall. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately \$26,000.

**Bridge No. A-02-023 (Martin Street over Fort Pond Brook)**

SELLS recommends that the steel corrugated pipe arch culverts be cleaned and coated with a new protective coating, weld/fasten steel corrugated plates over the areas where there is 100% section loss (holes) and severe rusting and steel delamination, place a reinforced concrete paved invert in both pipe arches, fill the voids between the headwalls and the pipe arches to prevent the infiltration of water behind the pipe arches and place riprap at both ends to prevent undermining. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately \$88,000.



#### **IV. PRIORITY OF REPAIRS TO TOWN OWNED BRIDGES**

The information provided above for the recommended repairs to the ten (10) Town Owned Bridges shows that repairs will be needed to a majority of the bridge structures to extend their service life. It shall be noted that the cost of water control for the repairs to be performed "in-the-dry" as well as for protection of the waterway is a significant cost for each of the bridge structures. In fact, the cost of water control is the basis for limiting our recommendations on several of the bridges. It shall also be noted that the water control measures, repointing of the stone masonry walls and other bridge repairs may require temporary easements and/or rights of entry from adjacent property owners at each of the bridge locations. The following is a priority list, by bridge, that indicates what SELLS believes should be the Town's approach to repairs on these structures. There may of course be savings by grouping similar work by repair/bridge type. For example, SELLS recommends that the Town's top priority should be the corrugated steel pipe culvert structures and in particular repairing and replacing the coating of these pipes as this is the primary structural member for these bridges.

1. Bridge No. A-02-023 (Martin Street over Fort Pond Brook) – Repairing the holes in the pipes, replacing the protective coating and placing a concrete invert should be the Town's top priority. These repairs are essential in order to ensure the current load carrying capacity of the structure.
2. Bridge No. A-02-009 (Brook Street over Nashoba Brook) – Replacing the protective coating and sealing the voids around the pipe ends is a high priority for this structure and should be addressed immediately.
3. Bridge No. A-02-021 (River Street over Fort Pond Brook at Vanderbilt Road) – Replacing the protective coating and sealing the voids around the pipe ends is a high priority for this structure and should be addressed immediately.
4. Bridge No. A-02-020 (River Street over Fort Pond Brook at Merriam Lane) – Replacing the protective coating and sealing the voids around the pipe ends is a high priority for this structure and should be addressed immediately.
5. Bridge No. A-02-008 (River Street over Fort Pond Brook at Carriage Drive) – Replacing the protective coating, primarily at the arch ends, is a moderate priority for this structure and should be addressed. However, it is not as critical as the corrugated pipes since the arch ends are not constantly exposed to water and do not exhibit the same level of deterioration even though this structure is significantly older than the corrugated pipe bridges.
6. Bridge No. A-02-022 (Stow Street over Fort Pond Brook) – This structure requires moderate repairs to the abutments and pierwall that can be accomplished for a relatively low cost of construction. However, there is already a full set of bridge replacement drawings for this bridge. SELLS recommends that these drawings, through the Town and MassHighway, be revisited to pursue future replacement of the bridge through MassHighway's Footprint Bridge Program.
7. Bridge No. A-02-010 (Parker Street over Fort Pond Brook) – This structure requires minor repairs to the deck arch and abutments without much benefit. It is



- recommended that the substandard bridge rail be replaced to address safety concerns and the Town seek the aid of MassHighway for possible future replacement.
8. Bridge No. A-02-007 (Lawsbrook Road over Fort Pond Brook) – This structure requires minor repairs to the deck and concrete “T” beams. The cost of water control would be expensive and difficult to accomplish and therefore the repairs needed on the underside of the bridge are not recommended considering the limited benefit they would provide. It is recommended that the existing substandard bridge rail be replaced to address a safety concern and the Town seek the aid of MassHighway for possible future replacement considering the age and condition of this structure.
  9. Bridge No. A-02-011 (Wetherbee Street over Nashoba Brook) – This structure requires minor repairs that will provide minimal benefits to the long term life of the structure and are therefore not recommended at this time because of the high cost associated with water control.
  10. Bridge No. A-02-018 (Concord Road over Nashoba Brook) – This structure requires minor repairs that will provide minimal benefits to the long term life of the structure and are therefore not recommended at this time because of the high cost associated with water control.

#### **V. WETLAND PERMITTING DISCUSSION**

Work will be required in the waterway at six (6) of the eight (8) recommended bridge locations to accomplish the necessary repairs. The water control measures shown in the Plans represent current methods used by MassHighway in diverting water so that work can be accomplished “in-the-dry” and so that sediments can be contained. There will be temporary impacts to Land Under Water as a result of installing cofferdams to accomplish repairs “in-the-dry.” In addition, there will be permanent impacts at those bridges where new riprap is proposed. These permanent impacts are limited to approximately 150 SF to 250 SF at each of the three (3) bridges where riprap is recommended.

#### **VI. PRELIMINARY CONSTRUCTION COST ESTIMATE**

The total construction cost, for all ten (10) Town Owned Bridges, at the Phase I - Preliminary Report design level is estimated to be approximately **\$875,000**, which cost does not include the cost for any utility work or right-of-way acquisitions. However, based on the recommendations for repairs from SELLS, the total construction cost estimate for the repairs that will be beneficial to the long term life of the bridge is approximately **\$552,000**. (See Appendix A for item summary sheets for each bridge structure)

**WPA Form 3 – Notice of Intent  
Supplemental Information**

Project: Proposed Repair/Rehabilitation of Town Owned Bridges

**A. General Information:**

1.) Project Location:

| Bridge #        | a. Street Address               | d. Latitude   | e. Longitude  | f. Assessors Map/Plat Number | g. Parcel/Lot Number |
|-----------------|---------------------------------|---------------|---------------|------------------------------|----------------------|
| Bridge A-02-009 | Brook Street over Nashoba Brook | 42° 29' 37.8" | 71° 25' 15.5" | Town Atlas Map E-4           | N/A                  |

8.) Property recorded at the Registry of Deeds for: (multiple locations):

Brook Street (Bridge #A-02-009) - Town Atlas Map E-4  
Record Book 7125 Page 38



A. 6.) **General Project Description:**

The Town has contracted Chas H. Sells Inc. to inspect and evaluate ten (10) Town-owned bridges in Acton. As a result of their phase 1 report, Chas H. Sells recommended the following immediate repairs to the bridge listed below to extend the structural capacity and upgrade the safety features.

**Bridge No. A-02-009 (Brook Street over Nashoba Brook)**

The steel corrugated pipe arch culverts be cleaned and coated with a new protective coating. Also, voids between the headwalls and pipe arches shall be filled to prevent the infiltration of water behind the pipe arches. Lastly, the stone masonry bridge rail and headwalls shall be re-pointed to fill the large gaps in the mortar.

## CONTROL OF WATER

The water control measures shown in the Plans represent current methods used by MassHighway in diverting water so that work can be accomplished “in-the-dry” and so that sediments can be contained.

The control of water conforms to the relevant provisions of Section 140 of the MassHighway Standard Specifications and the following:

This work includes all dewatering necessary to accomplish the rehabilitation of the existing structures as shown on the Plans.

The Contractor’s attention is directed to the section of these Special Provisions that addresses the requirements for Sedimentation and Erosion Controls for this project.

Stream diversions and dewatering of excavation shall be conducted to ensure that the existing corrugated metal pipes can be repaired and/or recoated with protected coating and that new riprap can be placed “*in the dry*.”

As part of the work, it is the responsibility of the Contractor to determine the need and extent of stream diversions, sedimentation basins and dewatering techniques and sedimentation controls needed to control water and sediment at the site. During the actual process of executing the excavation operations, the Contractor shall submit the methods and materials he/she proposes to use for the Town’s approval.

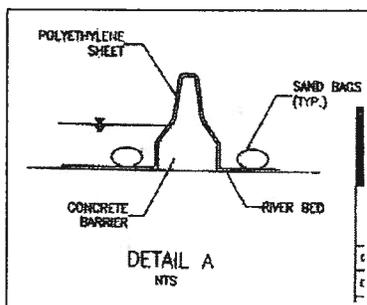
### Construction Methods

Stream diversions shall be conducted in such a manner as to minimize siltation and prevent contamination of the waterway.

Maximum screen sizes on the inlet side of all pumps shall not exceed ½ inch.

Recommended devices to control water at the site include, but are not limited to:

- Installation of precast concrete median barriers or blocks covered with sedimentation fabric and sandbags to reduce water infiltration.



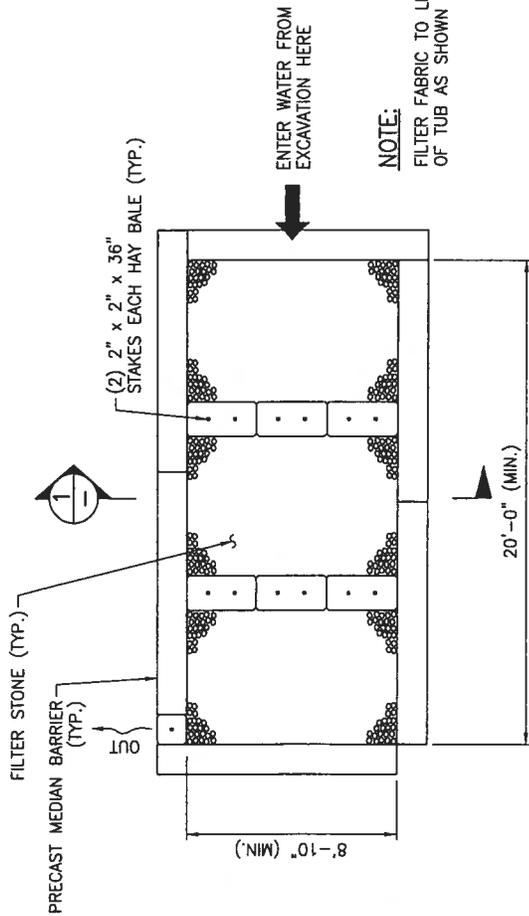
- Sandbag dams installed at the top of the excavation to provide temporary Control of water.
- Portable cofferdam system comprised of steel frames covered by an impervious fabric membrane.
- Temporary interlocking steel sheeting.

The Contractor is advised that the effectiveness of the water control method used will vary based on the field conditions and the time at which the actual excavation work is being performed. The Town has the right to order the Contractor to stop all operations when in his/her judgment the Contractor's water control operations are failing to produce adequate results or are posing a threat to the environment.

The Contractor shall provide the means of removing all sediment from water pumped from the excavation areas; this shall include the use of sedimentation basins, check dams, sedimentation fences or tanks.

#### **PROTECTIVE COATINGS:**

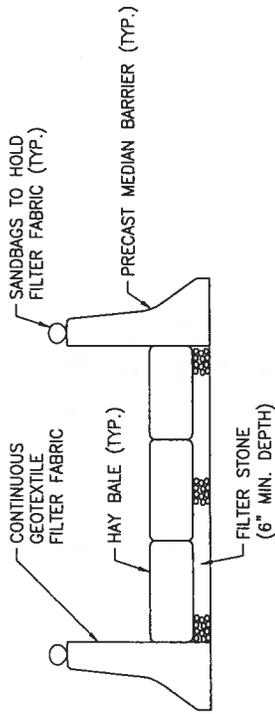
The metal corrugated bridges are proposed to be re-coated with a standard bituminous coating which is similar to what was originally applied. The coating would most likely be spray applied and be a minimum of 0.05" thick outside the normal water regions and 1/8" minimum thick within the normal water level areas. The coating would conform to AASHTO M-190 (Type A and C Coatings).



**PLAN**

**NOTE:**

REQUIRED SIZE TO BE DETERMINED BY CONTRACTOR AS APPROVED BY THE ENGINEER



**SECTION 1**

**FILTER BASIN**

SCALE: N.T.S.

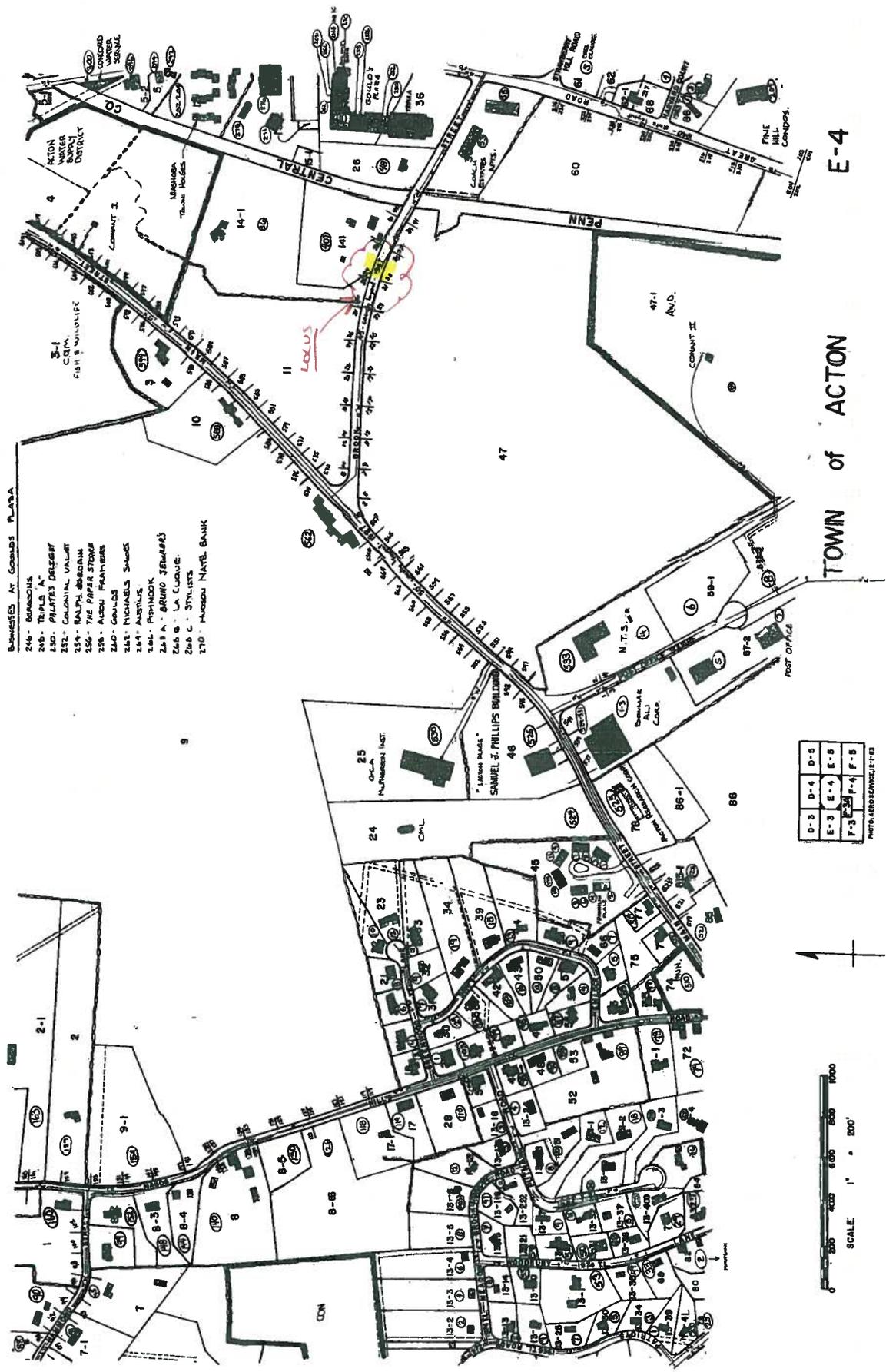
**FILTER BASIN NOTES:**

1. THIS WORK SHALL CONSIST OF THE CONSTRUCTION OF A FILTER BASIN TO BE USED DURING DEWATERING FOR THE PURPOSE OF DESILTING WATER BEFORE BECOMING SEDIMENT-LADEN. THIS SHALL BE ACCOMPLISHED BY MEANS OF PUMPING IT FROM THE CONSTRUCTION SITE INTO THE FILTER BASIN LOCATED AT AN ACCEPTABLE UPLAND AREA (SEE NOTE 6). PUMPING INTO THIS BASIN SHALL CEASE BEFORE THE FLOW FROM THE BASIN BECOMES SEDIMENT-LADEN.
2. SURFACE WATER FLOW SHALL BE DIVERTED AROUND THIS DEVICE.
3. THE CONTRACTOR SHALL PREVENT CHANNELIZED FLOW AND EROSION DUE TO FILTER BASIN DISCHARGE BY INSTALLATION OF ADEQUATE EROSION PROTECTION.
4. ONCE THE FILTER BASIN BECOMES FILLED TO 1/2 OF THE HEIGHT OF THE HAY BALES, ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IMMEDIATELY IN AN APPROVED DISPOSAL AREA OUTSIDE THE CONSTRUCTION SITE.
5. SEDIMENT CONTROL DEVICES ARE TO REMAIN IN PLACE UNTIL ALL DISTURBED AREAS ARE STABILIZED AND THE ENGINEER APPROVES THEIR REMOVAL. GROUND CONTOURS SHALL BE RETURNED TO THEIR ORIGINAL CONDITIONS UNLESS SPECIFICALLY APPROVED OTHERWISE BY THE ENGINEER.
6. LOCATION OF FILTER BASIN  
INITIAL LOCATION OF THE FILTER BASIN SHALL BE AS SHOWN ON THE PLANS BUT FINAL LOCATION OF THE BASIN SHALL BE RESERVED FOR THE RESIDENT ENGINEER'S JUDGMENT DEPENDING ON THE SITE STAGING CONSTRAINTS. THIS LOCATION MUST REMAIN IN AN UPLAND AREA OUTSIDE OF THE RIVER (LAND UNDER WATER) AND BORDERING VEGETATED WETLANDS.

**EXAMPLE  
OF  
SEDIMENT FILTER BASIN**

E-4

E-4



BUSINESSES AT CORNERS PLAZA

- 246 - BRANSON'S
- 248 - TRIPLE A
- 250 - PHILADEL DELIVERY
- 252 - COLONIAL VALLEY
- 254 - RALPH BROADMAN
- 256 - THE PAPER STORE
- 258 - ALCOA FRANKERS
- 260 - GOULDS
- 262 - MICHAELS SALES
- 264 - AUGUSTUS
- 266 - PPHHOOK
- 268 A - BRUNO JEWELERS
- 268 B - LA CLAUDE
- 268 C - SPYGLASS
- 270 - HUDSON NATL. BANK

|     |     |     |
|-----|-----|-----|
| D-3 | D-4 | D-5 |
| E-3 | E-4 | E-5 |
| F-3 | F-4 | F-5 |

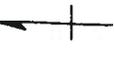


PHOTO AERIAL SERVICE 1978

U.S. Postal Service  
**CERTIFIED MAIL™ RECEIPT**  
 (Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at [www.usps.com](http://www.usps.com)

**OFFICIAL USE**

WESTBOROUGH, MA 01581

|                                                   |                |                  |
|---------------------------------------------------|----------------|------------------|
| Postage                                           | \$ 2.33        | 0720             |
| Certified Fee                                     | 2.15           | 15               |
| Return Receipt Fee<br>(Endorsement Required)      | 2.35           | Postmark<br>Here |
| Restricted Delivery Fee<br>(Endorsement Required) | \$0.00         |                  |
| <b>Total Postage &amp; Fees</b>                   | <b>\$ 7.83</b> | 05/07/2008       |

Sent To

Regulatory Review - NHGSP  
 Street, Apt. No.,  
 or PO Box No. 1 Rabbit Hill Rd  
 City, State, ZIP+4  
 Westborough, MA 01581

PS Form 3800, June 2002

See Reverse for Instructions

7004 2890 0004 6474 3660