CONNECTICUT

HISTORIC BRIDGE INVENTORY

FINAL REPORT: PRESERVATION PLAN

Federal Aid Project # HPR-PR-1(27)

Submitted to

Connecticut Department of Transportation
Office of Environmental Planning

May 1991

Cover illustration: Chapel Street West River Bridge, New Haven, 1882 Pratt pony truss, Berlin Iron Bridge Company, fabricator.

TABLE OF CONTENTS

INTRODUCTION

Goals of the Preservation Plan

The Connecticut Department of Transportation (ConnDOT) recognizes that historic bridges are cultural resources of public importance. Accordingly, ConnDOT has sponsored this Preservation Plan to provide guidance for the preservation of significant historic bridges within the context of the Department's overall mission to provide safe and efficient transportation for the people of Connecticut. This Preservation Plan is also intended to assist ConnDOT in meeting its statutory and regulatory responsibilities under state and federal historic preservation requirements. These requirements are discussed in detail within this report.

It is not within the scope of this Plan to address the structural soundness of any of the bridges discussed in the report. The current physical condition of the bridges, including their stability, state of general wear, and overall adequacy to accommodate present or future traffic conditions, has not been evaluated by this project. Such evaluation is properly the work of ConnDOT's Bridge Safety and Inspection Unit and the engineers designing individual bridge projects.

The Preservation Plan is the second major component of the Historic Bridge Inventory project. The first component was an inventory of 183 potentially historic bridges and an assessment of their historical significance. The project will also produce a publication intended for a general audience. It will describe the Historic Bridge Inventory and present photographs and text on the state's most significant historic highway bridges.

Bridges Included in the Preservation Plan

This Preservation Plan addresses 120 structures that are considered the most significant historic bridges under public jurisdiction. Each of these 120 bridges is included in the Plan for one or more of the following reasons:

It was already listed on the National Register of Historic Places when this project began;

It has been determined individually eligible for the National Register either prior to this project or as the result of this project's first phase;

It contributes to the significance of an historic district that is listed on the National Register; or

It contributes to the significance of a district or other collective resource (e.g., a reservoir system) that is either eligible or potentially eligible for the National Register.

Appendix A lists the bridges which are included in this Preservation Plan, arranged alphabetically by town, with the National Register status of the bridge indicated in the last column.

This Plan also addresses the 65 bridges on the Merritt Parkway that contribute to the significance of that National Register-eligible resource. These bridges are treated systematically rather than individually, in the chapter below entitled MERRITT PARKWAY. Appendix D lists the 65 contributing bridges, as well the eleven Merritt bridges that do not contribute to the significance of the Parkway.

Format of the Report

The Preservation Plan is divided into four principal sections. The first presents an overview of historic preservation legislation and regulations that apply to historic bridges. Second is a discussion of the general approaches which are appropriate to preservation of historic bridges. Third is a statement of goals for a comprehensive approach to Connecticut's historic bridges taken as a whole. Finally, the Plan presents, on a bridge-by-bridge basis, preservation recommendations which should be addressed when planning for the rehabilitation or replacement of individual historic bridges.

HISTORIC PRESERVATION: LEGISLATION AND REGULATIONS

The National Historic Preservation Act of 1966 established as a national policy the desirability of preserving buildings, structures, objects, sites, and districts with architectural, historical or archeological significance. To this end, the law established the National Register of Historic Places as the nation's official list of properties with national, state, or local significance. Properties listed on the National Register are deemed worthy of preservation as part of our cultural heritage. The law also created the Advisory Council on Historic Preservation to help resolve the sometimes competing claims of historic preservation and other public-policy goals, and authorized state historic preservation officers (SHPOs) as a vehicle for state participation in the planning process. Section 106 of the Act required all federal agencies to take into account the effect of their proposed undertakings on federally-owned properties listed on the National Register, and subsequent Executive Orders (11593) and amendments to the Act extended protective procedures to non-federally-owned properties listed on or determined eligible for listing on the National Register.

The Section 106 requirements impinge upon every federally funded bridge replacement or rehabilitation project, as well as on any undertaking that requires federal approval or licensing. The federal agency responsible cooperates with Connecticut Department of Transportation (ConnDOT) in fulfilling the requirements of Section 106. While in most bridge projects the Federal Highway Administration (FHWA) is the cooperating agency, other federal agencies such as the Urban Mass Transit Administration, the U.S. Army Corps of Engineers, or the U.S.

Coast Guard, are also likely to have funding or approval responsibilities that fall under Section 106. These requirements fall into three categories: determining whether a project involves properties listed or eligible for listing on the National Register; determining whether a project will have an effect on such properties; and minimizing or eliminating effects which are adverse, that is, effects which harm or destroy the historic resource. The first Section 106 responsibility, determination of National Register eligibility, was addressed in the first phase of the Historic Bridge Inventory. This Preservation Plan will assist the second and third Section 106 responsibilities, determining the effects of projects on historic bridges and identifying options which will minimize any adverse effects.

Under current regulations (36 CFR Part 800), federal agencies must seek the comments of the Advisory Council on Historic Preservation when a proposed project affects an historic property. The procedure for Advisory Council consultation requires, among other things, preparation of documentation describing the project in detail; determination of whether the project adversely affects the historic property; demonstration that alternatives to the project with adverse effects have been considered, as well as measures to mitigate the adverse effects; and the solicitation of comments from the SHPO, the public, local governments, and other interested parties. Usually, the process results in an understanding among the parties which is formalized in a Memorandum of Agreement.

Where general procedures are in place providing for consultation among FHWA, the SHPO, and the state transportation authority, the comments of the Advisory Council need not be sought for every project:

instead, a Programmatic Agreement (PA) may be negotiated. A PA governing the consultation process among FHWA, ConnDOT, and the Connecticut Historical Commission is at this writing the subject of continuing discussions among the agencies involved. This Preservation Plan is substantially intended to inform those discussions and to form the basis for this PA.

Legislation governing the Department of Transportation mandates avoidance or mitigation of adverse effects upon historic properties. Section 4(f) of the U.S. Department of Transportation Act of 1966 required that projects which took land in National Register historic districts identify all feasible and prudent alternatives to such use of land and minimize harm to the historic resource. Subsequent legislation and regulations extended these requirements to individually eligible historic properties, such as bridges, and identified specific options to be explored in such cases.

The Federal Highway Act of 1987 consolidated and extended Federal historic bridge policy. It declared that it is in the national interest to preserve historic bridges; required states to inventory their historic highway bridges; clarified that "reasonable costs" associated with preserving historic bridges for highway or non-highway-related use (and limited costs for relocation) are eligible for Federal bridge funds; added relocation for highway use to the options to be studied under 4(f); required the marketing of historic bridges that are scheduled for replacement; and authorized a technical study on historic bridge preservation.

The State of Connecticut has parallel procedures for projects undertaken by state agencies, regardless of whether Federal funds are used or not. Under the Connecticut Environmental Policy Act (Connecticut General Statutes Section 22a-1a-1 et seq.), the Connecticut Historical Commission often reviews state-sponsored undertakings in order to evaluate potential disruptions or alterations of historic resources. While these statutes do not explicitly mandate that all undertakings be reviewed by the Historical Commission, it is ConnDOT policy to submit them for review. Section 4b-64 of the Connecticut General Statutes requires state agencies to notify the Historical Commission of intent to demolish, transfer or dispose of any structure more than 50 years old. This bridge survey is intended to facilitate ConnDOT's compliance with these State review procedures. Because of the similarity in intent and procedure under Sections 106 and 4(f) and Connecticut state regulations, the planning considerations identified in this Preservation Plan address all three regulatory requirements.

Despite the similarity of intent shared by state and federal statutes and regulations, it should be noted that compliance procedures and requirements can vary widely depending on whether federal funds are employed in the project.

GENERAL PRESERVATION AND MITIGATION OPTIONS

This section presents general historic preservation options that apply to all the bridges covered by this Preservation Plan. It follows the overall approach developed in the following FHWA (Office of Environmental Policy) documents:

Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges. 1983.

Guidance on the Consideration of Historic and Archeological Resources in the Highway Project Development Process. 1984.

Review of Efforts to Market Historic Highway Bridges. 1986.

Guidance for Preparing and Processing Environmental and Section 4(F) Documents. 1987

We have grouped preservation options into three categories: No Action strategies, in which the historic bridge itself is left virtually unchanged (no effect); Selective Rehabilitation, in which the bridge is upgraded without damage to its historic qualities (no adverse effect); Major Structural Rehabilitation, which substantially changes a bridge, but if done with its historic qualities in mind, retains most of its distinguishing characteristics (mitigation of adverse effects).

NO ACTION

Retain in Service. The option of first choice with an historic bridge is to leave it in place as a functioning part of the transportation system. For many of the bridges in this study, present conditions are adequate and no projects are planned. Other historic bridges are functionally or structurally inadequate. For these, planning for replacement or rehabilitation projects should distinguish between what is necessary for public safety and what would be desirable in a new bridge at the site. Section 4(f) considerations specifically reference "serious and unacceptable safety hazards" and "intolerable restrictions on transport and travel" as the measure of justifying going beyond leaving the bridge in place and addressing problems with normal maintenance procedures. Federal regulations (23 CFR Part 625) allow flexibility in meeting American Association of State Highway and Transportation Officials (AASHTO) standards, and this flexibility can be applied to historic bridges. For instance, the Elm Street Bridge in Woodstock, Vermont, an 1870 wrought-iron Parker-patent truss, was considered for replacement because of inadequate load capacity, narrow width, and a sharp approach alignment, all of which were substandard per AASHTO. Because of the bridge's historical significance, state and federal planners analyzed the bridge in a wider context. The town contended that the width and alignment were in fact a blessing, because they forced traffic to slow down as it approached the narrow and congested streets of the village center. Furthermore, after examining the safety record of the crossing rather than just routinely applying the standards, it was found that the bridge had been the scene of very few accidents and no fatalities over more than 100 years of service. Thus the compromise was drawn that upgraded the capacity with a concealed beam structure beneath the deck, leaving the trusses in place and preserving their visual qualities.

The needs assessment implied by the consideration of the no-action option is useful for more than simply justifying the project. Careful and complete articulation of the functional and structural inadequacies of a bridge may help point the way to an option (or combination of options) which will allow it to function with a minimum of harm to its historic qualities.

Posting. Posting weight limits and restricting truck travel may allow an historic bridge to remain in service. The availability of nearby alternative routes will determine the feasibility of this option, as well as public safety considerations, especially fire-vehicle access. Posting will only provide a safe crossing and promote the preservation of the bridge **if there is a reasonable expectation that it will be observed and enforced.**

By-pass. In some cases, inadequate historic bridges can be bypassed, either at the site or at a distance from the bridge. The possibility of upgrading or establishing an alternative route should be considered as part of this option. The bypass option should be weighed against any "extraordinary construction difficulty or costs or ... adverse social, economic, or environmental effects" associated with the new structure (quoted from Programmatic 4(f)).

While by-passing does avoid the immediate loss of the historic bridge, it does not assure its long-term survival if it is allowed simply to deteriorate next to the new structure. When feasible, provision should be made for its continuing protection and maintenance. Keeping the old bridge in use (with repair as needed) for local traffic, restricting it to one-way use, or using it for pedestrians or bicycles can help to justify the continuing cost of maintenance. Also, in the case of bypass at the site, providing a pedestrian crossing on the old bridge may eliminate the need for sidewalks on the new structure, providing a small savings. Some bridges may be so severely deteriorated that even total bypass could not significantly extend their lifetime. Note that Connecticut Special Act 61-314, although it is limited to a specific bridge, offers some precedent in state law for assuring continuing maintenance of a bridge even if it is removed from highway use.

A special case of bypass is the use of a parallel span to carry one direction of traffic. Parallel spans may allow the retention of a bridge that is too narrow to function as a two-way structure, but has sufficient width and load-carrying capacity for one-way traffic. A length of approach sufficient to allow safe direction-separation is required. This option has the advantage of keeping the historic bridge as a functioning entity entitled to ongoing maintenance.

While generally not considered an adverse effect on the historic bridge, construction of a new structure close by may well have an effect on the historic bridge's setting and public visibility. Moreover, many of the bridges in this Plan are located within National Register-listed historic districts. New construction of a bypass or parallel span should not intrude on the significant qualities of the historic bridge or any surrounding district (see New Construction, below). Some historic districts may make the close-by bypass or parallel span options undesirable from the historic preservation viewpoint if important buildings or archeological resources must be sacrificed to save the bridge.

In constructing the new bridge in the close-by bypass or parallel span options, care must be taken not to damage the old bridge by overloading it with heavy construction vehicles, undercutting its footings with altered flow patterns due to temporary dams, and other such secondary impacts.

Bypass options may offer opportunities beyond those of simply saving the historic bridge. Relocating the crossing may actually improve alignment and alleviate problems with adjacent intersections. Bypass also may allow better traffic flow during construction, as the old bridge remains in use. On a larger scale, serious consideration of a remote alternative, either upgrading a parallel route or establishing a new one, may promote the solution of other problems (such as impact on historic districts or congestion, curves, or grade) which are associated with the route itself and which simple replacement of the bridge will do little to solve.

SELECTIVE REHABILITATION

Where the problem with an historic bridge is inadequate load capacity, selective rehabilitation, either alone or combined with other options, may allow the bridge to return to a state of usefulness. Replacement of deteriorated structural members with exactly duplicated material can sometimes result in increased capacity. In order for such repair to avoid affecting the historic integrity of the bridge, new work should match as closely as possible the historical dimensions, materials, and finish.

Trusses. With trusses, deteriorated members can be removed and replaced with new but otherwise identical parts, tension rods can be tightened, and rivets replaced with high-strength bolts. For iron trusses, steel is an acceptable substitute in replacing original parts.

One outstanding example of such rehabilitation is Allegan, Michigan's Second Street Bridge (Jackson et al., 8-10; Chamberlain, 25-26). In 1981-1983, this 18'-wide, 1886 wrought-iron through truss was rolled onto dry land for inspection. Deteriorated iron members were replaced, steel compression members matching the iron uprights were installed, and the bridge was rolled back onto its abutments to accommodate one-way local traffic. The cost of disassembly, inspection, rehabilitation and re-erection was half the estimate for a new bridge. The example of the Second Street bridge makes clear that such rehabilitation can be both functional and economic; it also shows that a bridge's specific situation is a major factor: the Second Street bridge was located in an urban setting where its single-lane width and limited load capacity were not considered major disadvantages, since other crossings were available nearby.

Somewhat more problematical is the practice of strengthening individual members by adding additional material to the original. Ideally, such additions should be visually unobtrusive, involve no removal of historical material, and not confuse the observer as to what is original and what is not. Many of the trusses in the Inventory have been strengthened in this way at one time or another. The use of welded-on plates to strengthen members which have corroded to the point of perforation is particularly common. After a certain point, however, such additions make it almost impossible to see any unaltered portion of the original truss, effectively destroying it as an historic resource. Structural reinforcement which is almost always inappropriate includes oversized gusset plates; substituting one form for another, such as a solid-web girder for a lattice girder; and welding on plate over so much of the surface that the original member is in effect imbedded.

A good example of rehabilitation using structural reinforcement has been recently completed in Connecticut. On the East Haddam swing bridge (Bridge No. 1138), the swing span's large eyebar diagonals have been supplemented by an additional pair of bars running between the original pair. The new material has had a minimum visual effect on the bridge; the original eyebars are still in place; and, from up close, it is easy to see what is original and what has been added.

Many of the trusses in this Plan have had their original floor stringers, decking, and roadway surface replaced. Replacement of these items, even with modern or upgraded materials, will in such cases not affect the historic integrity of the bridge.

Masonry Repair. Minor repair of concrete, stone and brick should follow accepted historic masonry guidelines (see Bibliography):

Cleaning of masonry and concrete should avoid using high-pressure water spray and strong chemicals (acidic cleaning agents will affect the surface of limestone, marble, and concrete).

Abrasive cleaning techniques such as sand-blasting, surface grinding, or wire brushes are destructive and should not be used.

Great caution should be observed regarding masonry coatings. Waterproof coatings are unacceptable on brick, stone, and concrete because they trap moisture, eventually causing surface spalling. Water-repellent, permeable ("breathable") coatings also may be problematical because with repeated application, they can clog and form an impermeable surface. For concrete, silane-type treatments have been shown to have long-lasting protective benefits. Silanes are absorbed into the concrete and do not alter the surface appearance.

Instead of relying on coatings, masonry moisture problems should be addressed by insuring adequate roadway drainage, well-maintained pointing, repair of surface cracks, and proper function of protective structures such as capstones. Moisture penetration into concrete structures is especially destructive in high-salt conditions: the resulting corrosion and expansion of reinforcing bar breaks up the concrete from within.

Where replacement of original features is called for, new work should match the historic conditions in terms of shape and form, materials, surface finish, and color. With stone and brick, new mortar should match the historic mortar in color, composition (high-lime, low-Portland cement content), and the depth, width and tooling of the joint. Concrete elements should be repaired with attention to subtle design features such as beveled corners of columns and distinctive contrasting (smooth and bush-hammered) surface finishes on railings. It is difficult to ensure long-term matching of concrete color, but use of well-cured test-patches using different mineral pigments can improve the appearance of the final result.

Masonry Reconstruction. The masonry analogy to limited replacement of truss members is the reconstruction of parts of arch rings or spandrel walls. Stone arches would probably need to be reconstructed only in the case of active movement in the spandrels or arch ring. If possible, reconstruction should be undertaken with the unaffected part of the bridge retained in place and shored up during reconstruction. Rebuilt portions of arches and spandrels should duplicate the original, preferably by using the original stone in its original position. Reconstruction of major portions of a stone bridge would seriously affect the historic integrity of the structure; extensive reconstruction would move beyond the category of "selective rehabilitation" into "major structural rehabilitation" discussed below.

Compared to stone arches, concrete arches can be reconstructed with less violation of their integrity, since the historical appearance can be more closely duplicated with proper forms and finishing techniques. Moreover, concrete inherently requires repair and reconstruction as it deteriorates. New spandrels should match the old in raised arch ring and finish, as should the railing. Decorative details should be repaired and incorporated into the new work if possible; otherwise, accurate casts of details should be used to fabricate reproductions. Concrete repair demands close analysis of cracks and spalling, and each situation will entail a different combination of patching, injection of concrete or epoxy fill, partial reconstruction of deteriorated features, and total reconstruction.

Railings present a special challenge in the rehabilitation of historic bridges. Railings are important decorative features which identify a bridge's period; in some cases they are among the bridge's essential historical features. Modern standards call for railings which not only will resist the impact of crashes but also provide smooth surfaces with no snag points. The lattice rails found on the early metal trusses and many historic stone and concrete railings do not appear to meet current criteria for vehicular guardrails, though they probably can serve as pedestrian railings for sidewalks. Safety is the paramount consideration when evaluating the type of guardrail needed, but where possible, guardrail standards should be considered flexibly in light of actual traffic and safety needs. Use of a modern guardrail between the vehicle lane and the sidewalk, where feasible and safe, will avoid physically affecting the historic railing and minimize the visual impact. Attaching ordinary guardrail to historic iron, stone, or concrete railings will impair their physical integrity and greatly obscure them from view and is preferable only to removing the historic railings entirely. On the other hand, installing guardrail on the inside of trusses where no railing presently exists, despite having a visual impact, may be desirable since it will protect the historic material of the truss itself.

Selective rehabilitation does not by itself address problems of alignment and inadequate width. However, when combined with other options, such as the upgrade of an alternate route, lane division with a parallel span, or posting, selective rehabilitation may allow an historic bridge to function without impact on its historic qualities.

MAJOR STRUCTURAL REHABILITATION

When the above options are inadequate to meet a project's needs, the historic bridge will probably be either substantially altered or replaced. Either case creates an adverse effect on the historic bridge which must be mitigated through a combination of documenting the historic bridge to the standards of the Historic American Engineering Record (HAER), performing major rehabilitation in such a way that the bridge's historic features are minimally harmed, or relocating the bridge to a new site.

Determining whether a proposed action constitutes "rehabilitation without affecting the historic integrity of the bridge" (language taken from Programmatic 4(f)) or substantial alteration is a matter of degree. Too much replacement of the historic fabric, even with exactly matching material, might be judged substantial alteration from an historic preservation viewpoint. The following actions, however, should always be considered substantial alterations and should have their harmful effects mitigated by minimizing the extent of alteration.

Widening

Except where the original proportions have already been changed (such as Bridge No. 980A, the Bulkeley Bridge in Hartford), widening adversely affects historic bridges by destroying the original proportions. For example, the narrowness of 19th-century trusses is part of their characteristic appearance, indicating their origin in a period before modern traffic needs. Widening should always be kept to a minimum, and should be considered only as an alternative to outright demolition. Except in the case of simple beam bridges, widening also will destroy or obscure important historic material such as spandrels, railings, or floor beams (though many bridges' floor beams have already been replaced or altered). Widening raises the same issues of impact on surrounding historic districts as new construction (see below).

Widening: Trusses. Trusses can sometimes be widened, especially in combination with the installation of secondary structural systems (below). In addition to the loss of original proportions, increasing the width will require new members between the trusses, such as floor beams and struts (on through trusses), and possibly the destruction of the original lower joints, thereby substantially affecting the historic integrity of the bridge. Widening may nevertheless be appropriate as an alternative to total demolition, especially where the bridge contributes to a surrounding historic district. Except where the setting is of paramount importance, relocation is more respectful of the bridge's integrity than the substantial alteration required by widening.

Widening: Stone Arches. Widening stone arches by adding a lane to one side should only be considered as a last resort. Such widening destroys the original dimensions of the bridge and also affects or destroys historic material in the spandrel walls and parapet, if any. Moreover, the view of the original bridge is obscured from one side. Reconstruction of sidewalks on stone arches should not obscure previously unaffected elevations.

Widening: Concrete Arches. Depending on the specific circumstances, widening can be more appropriate for concrete arches than for any other type of bridge. Although there are none in the Connecticut inventory, other states have multiple examples of concrete arches that were widened in kind in the historical period. In fact, the potential for widening was one reason concrete bridges originally became common. Widening should take place to one side only, so as to conserve historic material, and should duplicate existing sidewalks, railings, spandrel details, and ornamental elaboration, if any.

Substitute Structural System

Trusses. The load capacity of an historic truss can be improved by supporting it with intermediate piers or on beam or rigid-frame structures which essentially carry the load of the bridge. The introduction of a substitute or secondary structure should be done in such a way as to minimize removal of historic fabric (the lower joints are especially important to save intact). The substitute structural system should be as unobtrusive as possible. At its worst, such a technique can visually overwhelm the historic bridge and reduce the trusses to ornamental railings on a modern-appearing bridge.

The depth of the new structure below the lower chord should be minimal, both to retain the historic appearance of the bridge and to avoid impinging on the vertical clearance below the span. The effect of the new structure on the historic abutments should also be minimized.

Secondary structural systems have been used successfully on a number of historic bridges. Hart's Bridge, a wooden lattice truss in West Cornwall, Connecticut, is carried on a steel orthotropic deck structure about 2' deep and 120' long; it is concealed by the wooden siding enclosing the trusses (Matthew Roth, Connecticut: An Inventory of Historic Engineering and Industrial Sites, 1981, p. 123). The rehabilitation of Riverside Avenue Bridge in Greenwich (Bridge No. 3845) is an exemplary use of a secondary structural system: the girders which were added to carry most of the load pass through cut-away portions of the floor beams, almost wholly out-of-sight. Moreover, except for a portion of the floor-beam webs, all historical detail and material has been conserved.

Stone Arches. Stone arches with inadequate load capacity have been strengthened with reinforced-concrete structures. Adding a concrete arch under the stone ring will show, but it is not necessarily visually overwhelming; see the Pennypack Creek bridge, Philadelphia (Jackson, Great American Bridges and Dams, p. 150). In Connecticut, a stone arch in Glastonbury (Bridge No. 1401) was strengthened by adding a concrete footing to support brick arches beneath the original stone. While this alteration has obscured the original nature of the bridge when viewed from underneath, it has had little impact on the appearance of the bridge from the sides or at the roadway level.

Another type of secondary structural system which can upgrade an old stone bridge is a concrete arch or slab imbedded beneath the roadway. Where feasible, this technique leaves the overall appearance of the bridge unchanged and does no harm to the stone arch, spandrels, or parapets. Ideally, any such action should avoid changes to the level of the roadway, which might affect the relative height of any railings or parapets.

RELOCATION

For historic bridges which must be entirely replaced, moving the bridge to a new location can mitigate the adverse effect of replacement; consideration of such mitigation is required as part of 4(f) regulations.

As a practical matter, relocation only applies to truss or beam bridges. The feasibility of relocation is further constrained by the condition, dimensions, and form of the historic bridge. Long bridges, deck trusses, multiple-span bridges and trusses that are highly skewed or otherwise tailored to a specific location all pose problems in finding a workable setting. Pony trusses, the shorter through trusses, and small beam spans are the best candidates. Possible relocated settings include the Connecticut Trails system, land-trust and nature-preserve properties, state parks and trails, local parks, and selected museums (see Appendix). Some trusses might be repositioned beside the new bridge to serve as a pedestrian crossing.

FHWA procedures require that historic bridges be considered for re-use as highway bridges where conditions are less demanding than their original site. The narrowness, lightness of construction, and condition of many of the historic trusses in this Plan suggest that such opportunities are very limited.

An FHWA review of marketing of historic bridges implies that marketing is more successful in certain cases than others: personal contacts work better than general advertising, and government entities are the chief category of recipient in successful use of marketing.

Disassembly for relocation should respect the historic integrity of the bridge and allow reassembly with a minimum of alteration. Existing joints should be maintained intact by removing pins or drilling out rivets, and members should not be cut to ease disassembly. Storage conditions should be planned for minimal deterioration of the disassembled parts. Continued inspection and maintenance (and preservation restrictions on recipients) to assure long-term retention of the bridge's integrity is a necessary part of any relocation plan.

Relocation is not a meaningful action in some cases because the setting of certain bridges is so much a part of their historic significance that relocation to another site would be pointless. Olive Street Bridge in New Haven (#3752), for instance, is a highly skewed, completely non-symmetrical structure that was tailored carefully to a difficult crossing. The unusual proportions of this structure would be nonsensical if viewed at another location.

The following steps will help make the required marketing and relocation effort more productive:

Continue to maintain the direct, personal contacts established with likely recipients during the course of this project (see Appendix). Determine in advance what the physical requirements are for possible relocated bridges, including type of traffic, lengths needed, and funds available for re-erection. Current statutes allow an amount up to the cost of demolition as an eligible federally funded expense; in most cases this will be insufficient to relocate the bridge without additional funds.

Concentrate relocation/marketing efforts on the spans that have the best chance of re-use; a list of good candidates for relocation is in the Appendix of this report.

Review currently identified local bridge needs to ensure that opportunities for relocated highway use (fully eligible for funding) have not been overlooked.

Consider extending the response period for relocation recipients. Alternatively, stockpiling the high-priority relocation candidates for future placement.

NEW CONSTRUCTION

Construction of a new bridge in place of an historic bridge will in some cases have a visual impact on surrounding historic districts. In general, new construction should be as unobtrusive as possible so that the bridge will not visually overpower the remaining historic resources. Primarily this is an issue of scale. Making the new bridge wider, longer, deeper or higher than necessary or using visually heavy elements such as large beams or solid railings will create an intrusion into the historic character of most districts. Raising the level of the roadway will also often have an impact on nearby historic-district buildings. Modestly proportioned deck bridges with tubular railings are the most suitable when no alternatives exist to the replacement of historic bridges within historic districts.

In the case of historic districts, incorporating some of the form or materials of a replaced historic bridge into the design of a new bridge may be aesthetically desirable. Use of arches and stone facing may make a bridge accord better with surrounding historic buildings. However, attempting to reproduce some or all of a demolished historic bridge will not, from a historic preservation point of view, mitigate the loss of the actual bridge. Also, if too close a reproduction is built, some people will be confused as to whether the bridge is new or old, creating a false impression of the district's true character.

Similar considerations apply when a parallel span for bypass or lane division is constructed close to an historic bridge, whether or not it is in an historic district. The new span will diminish the public visibility of the bridge and will introduce a modern element into what might have been a relatively unchanged setting. The new design should be as visually unobtrusive as possible. Locating the new span as far from the bridge as practical will also improve the visibility of the older span. Again, traditional forms and materials can be used, but not to mask the honest fact of new construction.

CRITERIA OF EFFECT AND MITIGATION

As used in Federal and State regulations, a bridge project will affect an historic bridge if the undertaking "may alter the characteristics of the property" that qualify it for the National Register. Since National Register eligibility requires that an historic resource have integrity of "location, design, setting, [and] materials," virtually any action beyond painting, routine maintenance, or posting traffic restrictions will affect the historic qualities of a bridge.

However, effects need not be adverse. As detailed above, Selective Rehabilitation can be undertaken in such a way that there are no adverse effects on the significant characteristics of the bridge.

Moreover, many of the bridges in the Inventory have components which are not original to the bridge and which have not achieved historic significance in their own right. Removal or alteration of such features would normally not be considered an adverse effect. For example, the floor stringers, deck, and paving of most trusses have been periodically replaced, and replacement of any of these would normally not be an adverse effect so long as the floor-beams running between the trusses were not affected. Several bridges have sidewalks and railings that are neither original nor significant as historic alterations; their removal would not be an adverse effect. However, the replacement for such features should physically and visually affect the historic material and appearance of the bridge as little as possible.

New construction, such as for a parallel span or bypass, will affect an historic bridge, but the effect may not be judged adverse if measures are taken to minimize visual impact. Even if the effect is determined to be adverse, new construction which addresses the issues identified above can be considered to have mitigated the effect.

Relocation, substantial alteration, and demolition of historic bridges are always adverse effects. Federal undertakings are required to examine avoidance or mitigation of these effects, first by considering actions which minimize the effect by substantially retaining the important characteristics of the historic resource, as discussed above, and then by preserving the historical information embodied in the resource.

HAER DOCUMENTATION

Adverse effects on historic bridges can be mitigated by recording the bridge to the standards of the Historic American Engineering Record (HAER). In this way, the information present in the bridge as an historical artifact can be partly preserved through photographs, drawings, and written text, all prepared to archival standards as a permanent record of the bridge. While the information value is thus retained, the heritage value of having the actual bridge in its present condition is partly or wholly lost, and the public's opportunity to perceive Connecticut history in the landscape is thereby diminished.

The National Park Service provides documentation requirements for each HAER recording on a project-by-project basis. Generally, HAER recording requires large-format (4x5") photography, including the bridge's side and end views, underside, abutments and piers; close-up construction details, such as typical masonry or truss connections; and detail views of architectural and ornamental features such as plaques, lamps, railings, or any operating machinery (as on a movable span). Original drawings are reproduced onto large-format negatives (selectively if they are extensive), and old photographs are also copied as available. The photo-documentation is accompanied by a Narrative Report which describes the bridge in detail and discusses the bridge's engineering and transportation significance. The standards for preparing written and photographic documentation are contained in:

Guide for the Preparation of Photographic Documentation in Accordance with the Standards of the Historic American Buildings Survey/Historic American Engineering Record. Philadelphia: Mid-Atlantic Regional Office, National Park Service, May, 1987.

Guidelines for the Preparation [of] Written Historical and Descriptive Data in Accordance with the Standards of the Historic American Engineering Record. Philadelphia: Mid-Atlantic Regional Office, National Park Service, May, 1987.

HAER Standards for Documenting Historic Bridges (Draft). Washington: National Park Service, 1986.

The Inventory Forms produced by the Historic Bridge Inventory provide a substantial portion of the information required for HAER documentation. For all the bridges inventoried by this project, the

Inventory Forms identify the location of historical photographs and drawings and provide descriptive and historical material which will form the basis of the Narrative Report. Bibliographical information on the forms identify sources of additional historical material. Any Programmatic Agreement that is eventually agreed upon might specify that HAER recording will accompany any substantial structural alteration, widening, relocation or demolition of National Register listed or eligible bridges.

With many bridges, selecting the views that definitively record the important data embodied in the structure requires on-site judgment to interpret the Park Service's Schedule of Documentation (the formal specification document for any HAER recording project). It is insufficient to assign a photographer this task.

In six states that have completed the survey and assessment of highway bridges, the state transportation agency has undertaken HAER documentation of the most significant historic bridges independent of any regulatory requirement. These projects, covering thirty or fewer bridges, have included a combination of Level 1 (interpretive drawings, photography and narrative), Level 2 (photography and narrative) and Level 3 (inventory form and photography) documentation. HAER encourages these projects for several reasons: the most significant bridges deserve to be recorded for the national collection; natural disasters could destroy the bridges before they might be recorded for any regulatory purpose; and, there is a cost saving in recording a number of bridges at a time.

COMPREHENSIVE PLANNING FOR CONNECTICUT'S HISTORIC BRIDGES

In addition to being considered individually, the state's historic bridges should be planned for as a group. While some of the state's historic bridges are unique, others are multiple examples of the same type, such as the Berlin Iron Bridge pony trusses, early 20th-century town-built trusses, or the New Haven Railroad's standard highway crossings of the 1890s and the early 20th century. Ideally, all of these significant bridges should be preserved for posterity, but the preservation of some may be much more problematical than others. Therefore, where there are groups of similar resources, extra effort and expense to preserve some examples may sometimes make the replacement of others more reasonable. To aid the planning for similar historic bridges, the individual write-ups in this Plan identify closely similar structures.

In order to adopt a comprehensive view of Connecticut's historic highway bridges, it is necessary to articulate some basic goals and assumptions. The following are recommended as the basis for a comprehensive historic bridge policy:

1. All historic bridges with exceptional technological or architectural significance might be recorded to HAER standards prior to substantial alteration or demolition in order to preserve their informational value. ConnDOT might examine the feasibility of a pre-emptive HAER recording project for the most significant bridges, for the reasons noted at the end of the last section of this report.
2. While the ideal goal is to retain all the state's historic bridges, serious problems of safety, deterioration, functional obsolescence, and limited funding will compel choices.

3. Bridges which are unique in the state, which have exceptional technological significance, or which have strong claims for local historical significance should, if feasible, be preserved for their heritage value. This consideration applies to most of the 19th-century trusses, including all the New Haven Railroad overpass trusses, and to the Merritt Parkway bridges, which taken together form a unique resource of exceptional significance. Trusses that are primarily significant for

their technological significance can be preserved through relocation. But for bridges with exceptional local meaning, consideration should be given to preservation in place. Among these are most of the eligible 19th-century stone arches and 20th-century "City Beautiful" concrete arches.

4. Among bridges which are multiple examples of a particular type, the retention of some examples can compensate for the loss of others. The choice of which ones to preserve should take into account the number of similar types which exist, their geographical spread throughout the state, the significance of the type in the state's transportation history, and the survival prospects for those that remain. Off-system bridges enlarge the pool which preserves a particular bridge type. However, if all the off-system examples are deteriorating from total neglect, it makes no sense to count them when weighing the demolition of an intact example still under ConnDOT jurisdiction.

In addition to recommending the above as the fundamental approach to historic bridges, the Consultants have identified the following categories of essentially similar structures that can be planned for as groups. The Appendix of this report includes lists of the members of all the below-described categories.

Berlin Iron Bridge Company Lenticular Trusses. Because of the importance of this company as Connecticut's only major bridge fabricator, and the value of their bridges as representative 19th-century trusses, extraordinary consideration should be given to the preservation of both remaining through trusses and multiple examples of the eight smaller pony trusses throughout the state. All of these bridges are town-owned structures, and several are out-of-service. To continue to fund demolition and replacements of these bridges on a case-by-case basis will ultimately result in their extinction. Special attention should be paid to preserving those which retain a high degree of detail, such as Bridge No. 4575 in Talcottville, Vernon; or those which are early examples, such as or Bridge No. 4534 in Waterbury, the oldest extant example of the Berlin lenticular truss. These bridges are significant for their technology, their Connecticut-specific historic context, and their increasing rarity.

New Haven Railroad Early Pony Trusses. These three bridges are among the most technologically significant truss bridges in the state. The New Haven Railroad built them (and dozens more that have been demolished) as part of the widening of the New York-New Haven mainline to four tracks in the early 1890s. They are among the earliest known riveted, steel Warren pony trusses in the nation, with many unusual and archaic construction details. Their significance is based on their technology, their historical context, and their rarity.

Timber Trusses. There are only two under ConnDOT jurisdiction, and both have been treated in sensitive and occasionally exemplary fashion. Their continued survival in good condition will require some attention in the years ahead. They are significant for their technology and for their rarity in Connecticut.

Early 20th-Century Town-Highway Trusses (1901-1920). These three bridges represent the standardized structural technology of the early 20th century, yet in their lightness of construction represent the era of highway transportation before widespread automotive traffic. They are significant for their technology and their rarity; like the simple 19th-century trusses, bridges of this type once numbered in the hundreds.

Early 20th-Century Highway Trusses Over Railroads. These three bridges were all built between 1907 and 1912 by the New Haven Railroad as part of its system-wide upgrade of that period. They are all double-intersection Warren through trusses with heavy built-up members, and were designed by the engineering staff of the railroad. They are significant for their technology and their place in the development of the state rail system.

Trusses Built After 1920. The eleven bridges in this group were all built by the state Highway Department under its authority for trunk-line bridges, or were substantially funded by the Highway Department under the town-aid program or as emergency disaster-relief. Besides sharing this common administrative background, these bridges also reflect the design standards developed by state engineers, as well as the structural details distinctive of their period, such as the extensive use of rolled rather than built-up members. The eligible post-1920 trusses generally feature outstanding technology in the form of great size. More common examples, such as standard pony trusses, are also included; these too are significant for their technology because they represent a type of structure that was once common but is increasingly rare in the late 20th century. Several examples are the work of Berlin Construction Co., the 20th-century successor to Berlin Iron Bridge Co.

19th-Century Simple Masonry Highway Arches. These sixteen bridges all feature the traditional masonry construction that offered the strongest and most durable bridging technology available to most towns until late in the 19th century. Their locations range from relatively quiet country roads to more densely settled urban areas. They include simple rubble structures; spans with cut rings and barrel and rubble spandrels; and substantial structures with finely cut stone throughout. In planning for these bridges, effort should be made to preserve examples of both rural and urban examples, as well as examples of both modest construction and those that exhibit the work of highly skilled artisans. Consideration should also be given to geographic distribution throughout the state.

19th-Century Large or Decorative Highway Stone Arches. The four bridges of this type are all in densely built-up commercial areas. They all can claim a highly significant role in the development of their communities and most are relatively large. All are significant as excellent examples of workmanship, and some feature outstanding decorative or commemorative detailing.

19th-Century Rail-Carrying Stone Arches. These eight bridges were all built originally to carry railroad tracks. They are more heavily constructed than highway arches of the period, usually feature fine masonry work, and several are long enough to resemble tunnels. One example, Bridge No. 3682 in Stamford over the Rippowam River, was part of the initial construction of the mainline between New Haven and New York. Several of these bridges are on abandoned rail corridors. The group is distributed fairly evenly from east to west across the state. They are significant because they embody the distinctive characteristics of a 19th-century railroad construction.

Simple 20th-Century Stone Arches. The five bridges in this group are generally though not completely without extraordinary decorative or engineering features. They are all significant in the history of their communities, representing either an important river crossing, a railroad grade separation from a period of rapid commercial and industrial growth, or some connection with a larger resource (i.e., potential National Register district).

Decorative 20th-Century Stone Arches. This group includes three spans with outstanding decorative features, such as sculptural effects or polychrome masonry. They are significant for their visual character and their prominent place in their communities.

Stone-Arch Factory Passages. These two bridges are part of the Willimantic Linen/American Thread factory complex in Willimantic, and are notable primarily for their contribution to the significance of that historic industrial site.

Simple Highway Concrete Arches, 1920 and Before. This group of four bridges represents the early era of concrete bridges, when the new material won favor for its low cost, speed of construction, lack of overhead obstruction and ease of maintenance. They are significant primarily for the technology they embody, and for their rarity as early examples of their type. The Bloomfield and West Hartford examples were designed by the same local engineer; at least one should be preserved. The Court Street Bridge in New Haven (1907) will soon be the sole remaining example from the extensive and early concrete-bridge construction program by the New Haven railroad. (The other four examples are programmed for replacement.) It deserves preservation both for its technology and for its role in the history of transportation.

Decorative Concrete Arches, 1920 and Before. These four bridges in urban settings all exhibit outstanding ornamental elaboration, such as stone sides or sculptural flourishes. Their significance is based on their relative rarity, their visual and historical contribution to their surroundings, and their aesthetic character.

Decorative Concrete Arches, 1921 and Later. The ten post-1920 concrete bridges considered to be eligible for the National Register all have some unusual or outstanding attribute, such as extensive ornamentation, their place as part of urban beautification efforts, or both. The one exception to this general characterization is Bridge No. 1591 in Barkhamsted, which is significant primarily because it is part of a larger eligible resource (Barkhamsted Reservoir system).

Open-Spandrel Concrete Arches. These four bridges were all built by the state Highway Department; they are all large, multiple-span structures; and they all exhibit the distinctive open-spandrel technology. Primarily significant for this technology, they are also notable for their place in the development of the state transportation agency and their rarity.

Park Bridges. This group includes six spans in city or state parks that do not have any outstanding technological significance but contribute to the visual and historical character of the planned landscapes of which they form a part.

Simple Bascule Bridges. Movable bridges are almost always significant at least for their historical context, because the effort and expense of building them usually indicates that the crossings were important in the development of their communities. Of the four bridges in this category, three are in Bridgeport; at least one should be preserved so as to recall the importance of navigable channels in the city's industrial heyday.

Swing Bridges. The state's three remaining swing bridges include an exceptionally early example, Westport's Saugatuck River Bridge, listed on the National Register; a large and historically significant state-built bridge designed by an eminent engineer, the East Haddam Bridge; and a typical early 20th-century swing span in Bridgeport.

Unique Structures. These fifteen bridges are, for one reason or another, more significant than any category that could subsume them. They include large Connecticut River crossings, early movable bridges along the shoreline, early or prominent state projects, two Berlin Iron Bridge Co. trusses that are not lenticular, the earliest known example (1893) of a metal-beam bridge in the state, and the oldest bridge in this Plan (Hartford's Main Street Bridge).

THE MERRITT PARKWAY

The bridges of the Merritt Parkway are most appropriately treated as a unified group, for two principal reasons. First, despite individual differences in the bridges' finish and detail, the overwhelming concern in planning for their preservation is the impact on the Parkway as a whole. To separate these bridges from the historic and visual context of the Parkway and treat them as single structures would deny the circumstances that make the bridges significant and vitiate proper planning for the entire resource of the Parkway. Second, they are all part of a tightly defined National Register resource. The Parkway was previously determined eligible for listing on the National Register.

This Plan uses the same geographic definition of the Parkway employed in the National Register documentation: "The present right-of-way for Connecticut State Highway Route 15, between the New York State border at King Street in Greenwich and the western abutment of the Housatonic River bridge in Stratford. . . . [This] boundary includes the complete Merritt Parkway, as planned and built between 1934 and 1940. . . . The adjoining Wilbur Cross Parkway is not included, since it was planned and constructed as a separate project. . . . The Housatonic River bridge is not included since it was considered to be a connector between the Merritt and Wilbur Cross Parkways, but not truly a part of either."

Visual impacts addressed herein include not only the viewsheds from the Parkway itself, but the views of the bridges from surrounding streets, vistas that the designers of the Parkway also took into account.

The Merritt Parkway bridges, for the most part, do not have great intrinsic technological significance. The great majority of the bridges do not represent innovative engineering or construction for their day, nor do most of them represent major engineering projects. The major exception to this is the bridge carrying the Parkway over the Saugatuck River (#728), in Westport; the principal span is a 129'-long steel arch that has state-level significance as an engineering achievement.

Thus the critical factors in planning for the Merritt Parkway bridges are their historical appearance and the visual impact of any new undertaking on the Parkway as a whole.

The Appendix includes the list of 65 bridges that are included in this Plan. It also lists the eleven bridges that cross or are crossed by the Merritt that are not included in this Plan. There are three types of bridges excluded from the Plan: two minor structures (box culverts) with substantial overburden, no railings, and therefore no visual impact on the Parkway or surrounding public rights-of-way; eight structures built since 1950; and one bridge that is scheduled for replacement.

Following are discussions of the problems and preservation strategies relevant to the 65 bridges that contribute to the historic and visual character of the Merritt Parkway.

Structural Rehabilitation. Structural changes will generally not constitute adverse effects if they do not change the visual character of the bridge and the Parkway, including the spatial relationships between bridge and roadways and the surface finishes of the bridges. Replacing a concrete-frame structure with a concrete slab, for instance, would not be adverse as long as the new work was confined within the horizontal and vertical dimensions of the historic bridge and the spandrels and all surface detail remained intact. Other substitute structural systems, such as girder or beam structures, could also be fit within the existing dimensions of many of the bridges.

An example of this treatment is Bridge #711, carrying Lapham Road over the parkway in New Canaan. The original bridge was a concrete rigid frame with a segmental-arched barrel. Recently the Lapham Road roadway was rebuilt as a concrete slab, leaving the original parapets in place, and preserving the original spandrels to a depth of approximately one foot. Thus, the historic appearance of the bridge from the Parkway is impacted only negligibly.

In plate-girder spans, the structural members can be replaced with new built-up girders, or even with rolled beams, as long as the above-noted dimensional and decorative qualifications are observed.

Moisture and Salt Penetration. Many of the concrete bridges have required, or will require, some rehabilitation to correct surface spalling due to moisture and salt penetration into the body of the bridge, and subsequent action of the freeze-thaw cycle. The surface treatments are addressed below, but the problem of moisture and salt deserves separate consideration. First, it is worth noting that the objectives of safe transportation and historic preservation are fully in accord regarding this problem: the same spalling that impairs the function of a bridge also detracts from its historic appearance and integrity. Second, it seems illogical to repair the surface damage without correcting the cause of the damage. Third, in several projects ConnDOT and its consulting engineers have devised or utilized appropriate techniques to address this problem while preserving visible historic fabric. The masonry-arch bridges in Devils Hopyard State Park (#s 1603, 1604, 1605) for instance, had their roadways and fill excavated to the top of the arch, proper roadway drains set in place, and a membrane installed to prevent leakage from penetrating into the arch itself. The edges of the membrane are barely visible in the spandrels, a slight visual impact that is acceptable in return for the long-term viability of the bridges.

Rehabilitation of Surfaces. Along with spatial and dimensional integrity, the surface treatments are the most critical attributes of the bridges. The great variety of technique and style need not be recounted here, except to note that the bridges are the most prominent features of the parkway and their finishes and stylistic details are the design elements that most firmly fix the Parkway as a distinctive product of the 1930s. The materials employed on the surfaces -- concrete, metal and stone -- are treated in the following paragraphs. Railings are addressed in a separate section, below.

Concrete. The visual significance of the concrete surfaces is based on a combination of forms, textures and colors. While preserving original material will always be preferable to replication, new material will probably be required on at least some of the bridges. Particular attention is necessary regarding the texture and color of new concrete. ConnDOT has conducted proper concrete repair on several Merritt bridges. Bridge #750 (Parkway over Reservoir Road, Stratford), for instance, features new concrete on the spandrels; although not an exact match to the color and texture of the historic concrete, the new material approximates the old in both qualities, and the differences will be barely discernible within a few years. It may be worth examining this project to determine the basis for its relative success (i.e., specifications, contractor, or other reasons).

The **structural forms**, such as the shape of an arched opening, can be carefully repaired or remolded, including all details such as scoring and bevels. Many of the abutment faces -- the surfaces at right angles to the roadway -- feature paneling and some repetition of the motifs on the main surfaces of the spandrels. These faces should be kept in place or duplicated in the event of major abutment repair.

The **decorative forms** on the bridges include relief sculptures of historical personages and of survey and construction crews, as well as applied motifs. The latter include political emblems such as the state seal, and stylized Classical or nature-based designs. The relief and applied motifs are in generally good condition, apparently due to the use of special bonding agents in their original construction; the reed motifs on #712 (Route 124 over the Parkway, Stamford), for instance, have sharp edges, full depth, and appear almost brand-new. Nonetheless, these designs require continuing attention to preserve their appearance. Cracks should be sealed to prevent further damage, and any loss of section should be carefully restored (including color and texture). During major structural rehabilitation, temporary removal of ornamental features is sometimes unavoidable. Record photos and field measurements will help to replace them in their correct locations, and removal should be undertaken with the utmost care. Removal offers the chance to apply a new backing or to consolidate the concrete with epoxy, if required; the recess into which the motif will be replaced must be deep enough to accommodate any new backing without altering the original relationship of surface depths.

Attention to the **colors** of concrete includes not only the special decorative mixes, but the concrete that forms the main body of the bridge as well. This Plan's main section on rehabilitation techniques addresses duplication of historic concrete by means of sampling the original and use of test batches. These techniques are particularly appropriate for the Merritt bridges, where concrete construction was elevated into a virtual art form. Carefully matched concrete will not duplicate the historic tints exactly, but the differences will soften with age. Decorative concrete mixes include coal or cinders to make a black surface, and mica or quartz to create a near-white tint. These colors and techniques should be replicated in any repair of these features. Several of the bridges that have been recently rehabilitated were finished with a coating apparently intended to protect the concrete from moisture. The color of this material is not appropriate, and it will not cure into a closer match to old concrete as it ages. Nor is it clear whether this material is sufficiently permeable to permit the transpiration of trapped moisture. The use of this material should be reconsidered in light of both its permeability and its tint.

Attention to **textures**, like colors, includes both the surfaces of otherwise unadorned structural elements and decorative treatments. Historic photos of the bridges soon after they were built suggest that the structural surfaces were relatively smooth, and that the pebbly appearance of the bridges today reflects fifty years of weathering. Nonetheless, float sampling should be conducted on concrete to be replaced to determine the size of aggregate and proportion of components, and test batches should be prepared in order to discern the finish texture; test batches can be subjected to accelerated weathering through low-pressure water blast to approximate their ultimate appearance. Decorative treatments, such as sgrafitto panels, often consist entirely of textural effects. Duplicating these effects is highly skilled work that is nonetheless necessary to preserve the appearance of the bridges.

<u>Metal</u>. The metal features of the Merritt bridges include forged-steel railings and spandrel designs, and cast-iron railings. In

general, they do not demand any treatment substantially different from any metal bridge components: they should be kept painted to minimize rust. If sandblasting is used to remove corrosion and prior paint, the adjacent concrete sections of the bridge must be masked well to prevent damage from over-spray. Also, in the case of finely detailed shapes, such as the spiderwebs on #735 (Merwins Lane over Parkway, Fairfield) or the flowers on #760 (Route 110 over Parkway, Stratford), sandblasting must be performed at the lowest possible pressure to avoid damaging the sculpture. Simple metal panels, as on #706 (parkway over High Ridge Road, Stamford), can be cleaned using standard methods.

Railings. The railings on Merritt bridges are integral parts of their design and of the visual character of the Parkway as a whole. Generally, installing new barriers between the roadway and the existing railing is preferable to replacing the old railing with a solid new one. Many Merritt bridges provide a sidewalk alongside the crossing road; placing new roadway barriers between the roadway and the sidewalk would be preferable to impacting the historic railing.

Widening/Parallel Bypass. Any consideration of widening the entire Merritt Parkway is outside the scope of this study. It can be observed, however, that such widening could consist of a completely new roadway in place of the present one, which would result in the loss of all the bridges -- an adverse effect, needless to say -- or the creation of a parallel roadway to one side. As we understand the latter option, retention of the historic Parkway, including its bridges, might be possible.

Localized widening of the Merritt, and consequently extending the crossing spans, would have to be examined in terms of the impact on the entire historic landscape, and would likely be considered adverse. If localized widening of the Merritt nonetheless occurs, for roads crossing over the Parkway, building an independent new structure and retaining the old bridge in its entirety would be the preferred option. For bridges carrying the Merritt over local roads, retaining the historic span and building a parallel bypass would probably be the preferred option. The new span should be sufficiently distant that the view of the old bridge is not obscured.

Widening crossing roads, and with them bridges that pass over the Merritt, presents the additional option of carefully removing the spandrel and decorative treatments from one side of the historic bridge, widening the structure, and re-applying the historic material on the outside of the widened portion. This would have discernible impact on the historic landscape of the parkway, but the reuse of historic finishes in their entirety may be considered ample mitigation.

New Construction/Comprehensive Planning. A new bridge to replace an original Merritt Parkway bridge, which will always constitute an adverse effect, should be as unobtrusive as possible. The interchange bridges at Route 8 and 25, for instance, overpower the historic landscape of the Parkway. The reuse of applied ornament from 1930s Parkway bridges on a structure many times larger than the original should be avoided.

When constructing a new bridge, it would be preferable to attempt to produce an attractive bridge that complements the aesthetic character of the Parkway.

Finally, any further new construction on the Merritt should be examined in light of the integrity of the entire resource. It is difficult to argue that the loss of any single structure or feature of the Merritt by itself constitutes a loss of integrity for the whole Parkway. As these losses mount up, however, the historic landscape and roadscape of the Merritt Parkway could be lost.

PRESERVATION CONSIDERATIONS FOR INDIVIDUAL BRIDGES

The final section of this Preservation Plan presents preservation planning considerations for each of the bridges listed on or eligible for the National Register or contributing to National Register-listed districts. These individual bridge write-ups are intended to be used in conjunction with the Inventory Forms, which provide the basic descriptive information on the bridges and summarize their significance.

The individual bridge treatments consist of identification of important historic features; cross-referencing of similar bridges in the Plan (if any) according to the above-described categories, discussion of particular preservation options which have special implications for the bridge, and other relevant considerations such as planned nearby construction. The purpose of this section is to adapt the general preservation options discussed above to the special situation of each bridge.

For most of the bridges there are no immediate plans and there is no way to know what functional or structural problems will need to be addressed in the future. For these bridges, the general historic preservation considerations in this Plan and the specific discussions of the individual bridges should help bring into focus the particular qualities which give the bridge its significance and which need to be considered in any improvement project. Together, the general and specific preservation-planning considerations in this Plan will identify the options to be addressed in any proposed project's Section 106/4(f) statement.

Note: The following site-specific recommendation pages are ordered alphabetically by name of the town in which the bridge is located.

BRIDGE NO. 1496

Routes 318 and 181 over Farmington River, West Branch, Barkhamsted

Description: 1939, steel Parker through truss; fabricated by Pittsburgh-Des Moines Steel Co.

Similar Structures in Preservation Plan:

Trusses, 1921 and Later: 3788, 562, 1649, 1524, 1487, 1561, 4434, 507, 1415, 349

Parker Through Trusses, 1921 and Later: 3788, 1649, 507, 349

Historical Significance: Typifies truss-bridge construction during the automotive age. Built under the state Highway Department's trunk-line bridge program.

Preservation Planning:

General Considerations: This bridge was rehabilitated in 1985, and the entire floor system (floor beams, stringers, deck) appears to date from that project. The recent work did not compromise the historic integrity of the structure. based on the recent decision to rehabilitate rather than replace, it is assumed that the bridge is functionally adequate (width, clearance, alignment, etc.)

Structural Rehabilitation: Selective patching and in-kind replacement will not impair the historic integrity.

BRIDGE NO. 1591

Routes 318 over Saville Dam Spillway, Barkhamsted

Description: Small 1940 concrete arch with cut ring stones and rubblestone facing on the spandrels and parapet; built as part of the Saville Dam.

Similar Structures in Preservation Plan: other similarly detailed concrete arches from this period include Bridges Nos. 1537, 4992, 3645, 948, 992, 963, 4166, 5041, and 1117.

Historical Significance: Integral part of an historically significant engineering work, the Barkhamsted Reservoir.

Preservation Planning:

General Considerations: Current roadway width (40') appears adequate for present needs and, at any rate, is determined not only by the bridge but by the entire dam. Obviously, options for the bridge can only be assessed in terms of the entire structure's preservation.

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of exterior damage should seek to duplicate the existing stonework as closely as possible, and replacement mortar should match the historic mortar in color, composition (especially the lime-cement ratio), and joint tooling. Sealers on historic stonework are not recommended: impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: This bridge has interest primarily as a component of the larger resource, the Barkhamsted Reservoir. Therefore, substantial reconstruction of the concrete arch will not affect its contribution to the resource provided the stone spandrels and parapets are retained.

Guardrail: Present roadway protection is limited to the existing parapet. If additional protection is deemed necessary, the first choice from an historic preservation point of view would be to install guardrail between the shoulder and sidewalk, with the second choice installing metal guardrail in front of the existing parapet.

BRIDGE NO. 3788

Depot Street over Naugatuck River, Beacon Falls

Description: 1935, steel Parker through truss, 1 span; fabricated by American Bridge Co.

Similar Structures in Preservation Plan:

Trusses, 1921 and Later: 1496, 562, 1649, 1524, 1487, 1561, 4434, 507, 1415, 349

Parker Through Trusses, 1921 and Later: 1496, 1649, 507, 349

Historical Significance: Typifies truss-bridge construction during the automotive age. Built under the state Highway Department's emergency relief program after a major flood.
One of three structures in the Preservation Plan fabricated by American Bridge Co.

Preservation Planning:

Structural Rehabilitation: Selective patching and in-kind replacement will not impair the historic integrity.

Bypass: The wide overflow channel to the west of the main channel of the river would complicate this option, although lack of buildings upstream from the present bridge would appear to permit bypass.

Relocation: The 200' span length would make this a difficult relocation job; a new site would also distance the bridge from its flood-related local historical context.

BRIDGE NO. 1508

Route 189 over Wash Brook, Bloomfield

Description: Small 22'-span concrete arch with paneled spandrels, 1913.

Similar Structures in Preservation Plan: Bridge No. 3651 in West Hartford is of similar significance and somewhat older.

Historical Significance: Significant as a relatively early and well-preserved example of concrete-arch construction.

Preservation Planning:

Structural Rehabilitation: This bridge's significance derives from the fact that it is an early example of concrete construction. Unlike the Merritt bridges, which can be structurally reconstructed with little effect on their significance (which is primarily visual), substantial reconstruction of this arches would destroy its integrity, rendering it merely commemorative. If it should become so deteriorated that selective rehabilitation could no longer upgrade it, it should be photographed in detail, including photographs during demolition, in order to show such features as the reinforcing system and cross section of the concrete. Any structural work should attempt to keep the original spandrels intact.

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of spalling and scour should seek to duplicate the form, color, and surface texture of existing concrete. Penetrating, semi-permeable sealers can assist in reducing weathering. However, most concrete damage is due to moisture from the roadway, not weather. In addition to erosion effects, water penetration results in freeze-thaw damage and corrosion-expansion of reinforcing road. Impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Widening. If additional width were needed for Route 189, widening the bridge, to one side only, would be preferable to outright demolition. Use of this bridge as one direction of a widened Route 189 should also be considered, with a parallel bridge separated from the historic structure providing the other lanes.

Bypass. Building density would seem to make bypassing the bridge with a wide road difficult.

BRIDGE NO. 325

(BOSTON AVENUE BRIDGE)

Route 1 over Stillman Pond Brook and railroad spur, Bridgeport

Description: 1910 concrete arch with raised arch ring and scored abutments. The bridge was widened to the north in 1934, including a new parapet topped by an iron fence. Commemorative plaque notes its construction by the City of Bridgeport and the Union Metallic Cartridge Company, which owned the adjacent large factory complex in 1910.

Similar Structures in Preservation Plan: Other early concrete arches include Bridges Nos. 3651 (1901) and 1508 (1913).

Historical Significance: In addition to being a relatively early example of concrete-arch construction, this bridge has historical significance because of its association with Union Metallic Cartridge, an important Bridgeport industry, and as part of the State Highway Department's Route 1 improvements.

Preservation Planning:

Structural Rehabilitation: Since this bridge has already been modified, and its significance is historical as well as intrinsically technological, substantial reconstruction of the arch would not affect its integrity as seriously as some bridges. In such reconstruction, care should be taken to preserve as much of the spandrel and abutment detail as possible. New concrete should match the existing in terms of form, color and surface texture. It is especially important to preserve the commemorative plaque and south railing.

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of spalling and scour should seek to duplicate the form, color, and surface texture of existing concrete. Penetrating, semi-permeable sealers can assist in reducing weathering. However, most concrete damage is due to moisture from the roadway, not weather. In addition to erosion effects, water penetration results in freeze-thaw damage and corrosion-expansion of reinforcing road. Impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Widening. Although the 1934 widening itself has some historic significance, additional widening on the north side would be preferable to total demolition of the bridge.

Guardrail. Presently there are no roadway barriers other than the concrete railings. If it were determined that additional protection were needed, installation of metal guardrail between the sidewalk and the road would be preferable to altering the concrete railing. The second choice, from a historic preservation point of view, would be installing guardrail against the concrete railing.

Bypass. Building density would appear to make total bypass of a wider Route 1 difficult, even with lane division and use of the present bridge for one direction.

BRIDGE NO. 3637

(YELLOW MILL BRIDGE)

Stratford Avenue over Yellow Mill Channel, Bridgeport

Description: Double-leaf heel-trunnion deck-girder bascule, with steel and concrete-beam approach spans; erected 1924-1929. Other features include paneled concrete railing on approaches, lamp standards, early if not original steel railing on the movable spans, and brick operator house and former comfort station buildings.

Similar Structures in Preservation Plan: Other bascules include Bridges No. 327, 363, 4251, 4252.

Historical Significance: Significant as a large example of 20th-century movable bridge engineering and as a component of Bridgeport's historic industrial landscape. The scandal over the bridge's construction was a major factor in bringing to power long-time Socialist mayor Jasper McLeavey.

Preservation Planning:

General Considerations: The decorative and secondary features of this bridge are important to preserve because they indicate the bridge's period of origin. These include the two small buildings, the lamp standards and the original railings. Although somewhat deteriorated at present, attention should be given to refurbishing these elements as part of any rehabilitation work.

Maintenance: Like any steel bridge, this one will have its life extended by reduction of road salt, periodic washing, and a regular paint cycle. The steel and concrete approach spans are of secondary significance to the bascule itself, but their useful life will also be shortened if weathering, spalling, and salt penetration attacks the concrete or if the steel is allowed to corrode.

Mechanism: It does not appear that this bridge is currently operated. Should it be returned to working condition, the drive mechanism of the bridge should be preserved intact as much as possible, replacing components in kind as needed. The electrical motors and controls have probably been replaced or modified many times and at any rate are less of an intrinsic part of the design than the gearing and structure itself.

Structural Rehabilitation: Replacement of members with like material will have little impact on the bridge's integrity. Thus it would preserve the bridge's historic value to replace the bascule beams with identical riveted plate-girder components, but not welded-up beams. Similarly, the weights, pinions and drive gears can be replaced in kind, provided the original materials and dimensions are respected. The choice of deck material is not of great historical importance.

Widening: From a practical point of view, widening this structure can only be done by constructing a modern parallel span or replacing the bridge altogether. Given that this bridge was designed to support streetcar loadings, it would seem that it could be made to carry at least one direction of traffic if it were necessary to provide more capacity for the crossing.

Guardrail: If additional roadway protection is needed, the least impact would come from installing guardrail between the roadway and sidewalk, with the second choice being metal guardrail installed against the historic railings.

Bypass: The bridge could be completely bypassed, but given its potential to be rehabilitated or at least serve as one direction, the bypass option would seem remote.

BRIDGE NO. 4251
(CONGRESS STREET BRIDGE)

Congress Street over Pequonnock River, Bridgeport

Description: Scherzer Rolling-lift deck-girder bascule; tile-roofed operator's house; concrete-arch approach spans with pilasters, raised arch ring, rough-textured spandrel and parapet surfaces; erected 1911.

Similar Structures in Preservation Plan: Other bascules include Bridges No. 327, 363, 3637, 4252.

Historical Significance: Significant as an example of 20th-century movable bridge engineering and as the earliest extant of a number of movable bridges which were an integral part of Bridgeport's historic industrial landscape.

Preservation Planning:

General Considerations: The decorative and secondary features of this bridge are important to preserve because they indicate the bridge's period of origin. These include the operator's house and the concrete arches and parapets. Although somewhat deteriorated at present, attention should be given to refurbishing these elements as part of any rehabilitation work.

Maintenance: Like any steel bridge, this one will have its life extended by reduction of road salt, periodic washing, and a regular paint cycle. The concrete approach spans are particularly well detailed and help indicate the age of the structure; their useful life will also be shortened if weathering, spalling, and salt penetration are allowed to attack the concrete. Control of runoff, use of a roadway membrane, and repair of spalled or scoured concrete will help to preserve these parts of the structure. Any concrete repair should seek to duplicate the original in form, color, and texture, with special attention to the exposed aggregate texture on the spandrels and parapets.

Mechanism: It does not appear that this bridge is currently operated. Should it be returned to working condition, the drive mechanism of the bridge should be preserved intact as much as possible, replacing components in kind as needed. The electrical motors and controls have probably been replaced or modified many times and at any rate are less of an intrinsic part of the design than the gearing and structure itself.

Structural Rehabilitation: Replacement of members with like material will have little impact on the bridge's integrity. Thus it would preserve the bridge's historic value to replace the bascule beams with identical riveted plate-girder components, but not welded-up beams. Similarly, the weights, rolling gear, pinions and drive gears can be replaced in kind, provided the original materials and dimensions are respected. The choice of deck material is not of great historical importance.

Rebuilding of the concrete arches will have relatively little effect on the integrity of the resource if the characteristic spandrel and parapet details are retained.

Widening: At 55', it appears that this bridge has sufficient roadway width for its present and future needs. From a practical point of view, widening this structure can only be done by constructing a modern parallel span or replacing the bridge altogether. Given that this bridge was designed to support streetcar loadings, it would seem that it could be made to carry at least one direction of traffic if it were necessary to provide more capacity for the crossing. Adding a parallel span will be complicated by the building density in the area.

Guardrail: If additional roadway protection is needed, the least impact would come from installing guardrail between the roadway and sidewalk, with the second choice being metal guardrail installed against the historic railing.

Bypass: The site does not lend itself well to bypass; however, actual or potential crossings on parallel streets could reduce the demands on this bridge.

BRIDGE NO. 4252

East Washington Avenue over Pequonnock River, Bridgeport

Description: Strauss heel-trunnion deck-girder bascule; tile-roofed stuccoed operator's house; original steel and cast-iron railing; girder approach spans; erected 1925.

Similar Structures in Preservation Plan: Other bascules include Bridges No. 327, 363, 3637, 4251.

Historical Significance: Significant as an example of 20th-century movable bridge engineering and a component in Bridgeport's historic industrial landscape.

Preservation Planning:

General Considerations: The decorative and secondary features of this bridge are important to preserve because they indicate the bridge's period of origin. These include the operator's house and the original railing. Although somewhat deteriorated at present, attention should be given to refurbishing these elements as part of any rehabilitation work.

Maintenance: Like any steel bridge, this one will have its life extended by reduction of road salt, periodic washing, and a regular paint cycle.

Mechanism: It does not appear that this bridge is currently operated. Should it be returned to working condition, the drive mechanism of the bridge should be preserved intact as much as possible, replacing components in kind as needed. The electrical motors and controls have probably been replaced or modified many times and at any rate are less of an intrinsic part of the design than the gearing and structure itself.

Structural Rehabilitation: Replacement of members with like material will have little impact on the bridge's integrity. Thus it would preserve the bridge's historic value to replace the bascule beams with identical riveted plate-girder components, but not welded-up beams. Similarly, the weights, pinions and drive gears can be replaced in kind, provided the original materials and dimensions are respected. The choice of deck material is not of great historical importance.

Widening: At 43', it appears that this bridge has sufficient roadway width for its present and future needs. From a practical point of view, widening this structure can only be done by constructing a modern parallel span or replacing the bridge altogether. It would seem that it could be made to carry at least one direction of traffic if it were necessary to provide more capacity for the crossing. Adding a parallel span will be complicated by the building density in the area.

Guardrail: If additional roadway protection is needed, the least impact would come from installing guardrail between the roadway and sidewalk, with the second choice being metal guardrail installed in front of the historic railing.

Bypass: The site does not lend itself well to bypass; however, actual or potential crossings on parallel streets could reduce the demands on this bridge.

BRIDGE NO. 4455
(PLEASURE BEACH BRIDGE)

Central Avenue over Lewis Gut, Bridgeport

Description: Swing bridge, Warren through truss, 1924, with steel trestle approaches; over 1,200' long.

Similar Structures in Preservation Plan: no other swing bridges of this period remain in the state. Earlier swing bridges include 1349, Westport, and 1138, East Haddam.

Historical Significance: Typical 20th-century truss design adapted for a swing span; of historical interest as part of the former Pleasure Beach amusement park complex.

Preservation Planning:

Mechanism: The drive mechanism of the bridge should be preserved intact as much as possible, replacing components in kind as needed when they wear out. The electrical motors and controls appear original. Although of secondary importance to the movable bridge itself, they should be extensively photographed before any electrical upgrade.

Maintenance: Like any steel bridge, this one will have its life extended by reduction of road salt, periodic washing, and a regular paint cycle. The approach spans are of secondary significance to the swing span, but their useful life will also be shortened if not maintained.

Structural Rehabilitation: Selective replacement of members with like material will have little impact on the bridge's integrity. Similarly, the pinions and drive gears can be replaced in kind, provided the original materials and dimensions are respected. The choice of deck material is not of great historical importance.

Guardrail: No roadway protection at present; installation of metal guardrail on the truss will not affect its integrity.

Widening: Not practical, either through modification of the existing span or construction of parallel span. The limited use of Pleasure beach suggests that width is not a problem.

Bypass: Not practical given the long approaches.
Relocation: Not practical.

BRIDGE NO. 900

Route 25 over Still River, Brookfield Center, Brookfield

Description: 1920, 1-span ashlar-masonry arch.

Similar Structures in Preservation Plan: There are four other simple, 20th-century masonry-arch bridges in this Plan: 5011, 4149, and two other bridges that carry public highways but do not have ConnDOT bridge numbers -- Hartford Road in Manchester and Arch Street in Putnam.

Historical Significance: Well-preserved example of heavy masonry construction. Central location in the community contributed to the use of masonry at a time when less expensive but less attractive alternatives were available (i.e., trusses, concrete beams or arches, steel beams).

Preservation Planning:

General Considerations: Recent rehabilitation of roadway and railings observed preservation condition maintaining visibility of masonry sides.

Structural Rehabilitation: Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

BRIDGE NO. 562

Route 7 over Housatonic River, Canaan

Description: 1930, steel Warren (with verticals) deck truss, 3 span; fabricated by American Bridge Co.

Similar Structures in Preservation Plan:

Trusses, 1921 and Later: 1496, 3788, 1649, 1524, 1487, 1561, 4434, 507, 1415, 349

Deck Trusses, 1921 and Later: 1415

Warren Trusses, 1921 and Later: 1487, 1524, 4434

Historical Significance: A major structure built under the state Highway Department's trunk-line bridge program; typifies truss-bridge construction during the automotive age. One of three structures in the Preservation Plan fabricated by American Bridge Co.

Preservation Planning:

Structural Rehabilitation: Selective patching and in-kind replacement will not impair the historic integrity.

Bypass: Lack of dense settlement in the immediate vicinity would appear to allow close-by bypass. However, during planning for this bridge, subsurface conditions and riverbank topography posed uncommon difficulties for the state engineers, which shaped the decision on siting; examination of this option would need to re-examine these issues in light of evolved engineering practice and construction technology.

Relocation: The site-specific configuration (non-parallel chords create a six-degree roadway rise) and the locational significance of the bridge (built when Route 7 was the only major north-south road in western Connecticut) combine to make this option seem less than viable.

BRIDGE NO. 1649

BUTTS BRIDGE

Butts Bridge Road (Route 668) over Quinebaug River, Canterbury

Description: 1937, steel Parker through truss, 1 span; built by Fort Pitt Bridge Works.

Similar Structures in Preservation Plan:

Trusses, 1921 and Later: 1496, 3788, 562, 1524, 1487, 1561, 4434, 507, 1415, 349

Parker Through Trusses, 1921 and Later: 1496, 3788, 507, 349

Historical Significance: Typifies truss-bridge construction during the automotive age. Built under the state Highway Department's emergency relief program after the flood of 1936.

Preservation Planning:

Structural Rehabilitation: Selective patching and in-kind replacement will not impair the historic integrity.

Bypass: Building density and topography would not appear to prevent either total bypass or bypass for lane division.

Relocation: Span length (222') would make this a difficult relocation job; a new site would also distance the bridge from its flood-related local historical context.

BRIDGE NO. 5222

Town Bridge Road over Farmington River, Canton

Description: 1895, wrought-iron Parker through truss, 1 span, pin-connected; built by Berlin Iron Bridge Co.; extensive portal ornament (cresting and finials).

Similar Structures in Preservation Plan: none

Historical Significance: Besides being one of the few 19th-century wrought-iron trusses to survive in the state, it exhibits the range of work undertaken by Berlin Iron Bridge Co., beyond the lenticular trusses for which the firm is famous.

Preservation Planning:

General Considerations: The town has recently rehabilitated the bridge, including installation of a new corrugated-deck floor system, the patching of numerous members, and attachment of new W-rail roadway barriers inside the truss webs. Apparently, therefore, the archaic width and alignment, and the vertical clearance of less than 13', are not considered to be serious problems for the crossing. Nearby alternate crossings are available both upstream and downstream.

Structural Rehabilitation: Continued welding of patch plates with eventually compromise the historic integrity and appearance of the bridge. Replacement of members with like components in steel should be considered if load capacity becomes a concern; again, extensive replacement would compromise the historic integrity.

Bypass: The lack of nearby buildings would appear to make this a viable option.

BRIDGE NO. 1537

Route 198 over Natchaug River, Chaplin

Description: Large (75' span) 1926 arch, with raised arch ring, keystone, pilasters, and paneled spandrels. The recessed panels of the parapet have a rougher texture created by exposed aggregate.

Similar Structures in Preservation Plan: other similarly detailed concrete arches from this period include Bridges Nos. 1591, 4992, 3645, 948, 992, 963, 4166, 5041, and 1117.

Historical Significance: One of the larger and most finely detailed of the State Highway Department's projects from the 1920s and 1930s, probably designed to complement the scenic qualities of the location, known as "Diana's Pool."

Preservation Planning:

General Considerations: Since the decorative concrete features are such an important part of the bridge, special attention needs to be given to any work which seeks to repair deteriorated surfaces or elements. Exact reproduction of paneled forms and close matching of any patching is especially important in this bridge. Eventually work will be needed to repair the effects of erosion already evident. Past episodes of patching, particularly on the parapet, show little attempt to match the historic concrete.

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of spalling and scour should seek to duplicate the form, color, and surface texture of existing concrete. Penetrating, semi-permeable sealers can assist in reducing weathering. However, most concrete damage is due to moisture from the roadway, not weather. In addition to erosion effects, water penetration results in freeze-thaw damage and corrosion-expansion of reinforcing road. Impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: Because much of this bridge's significance lies in its decorative effects, considerable structural upgrading could be done provided the paneled spandrels, arch ring, and parapet were retained.

Widening: Widening the bridge, to one side only, would only preserve the bridge's scenic quality if the arch ring, spandrel, and parapet detail were reproduced on the widened side. Any new parallel span east of the structure should respect the bridge's setting.

Guardrail: If roadway protection needs to be enhanced, the effect on the existing railings should be minimized. Installation of guardrail at the edge of the roadway would have minimal effect, but the present width (28') may not allow for this option. Installation of metal guardrail in front of or even abutting the present parapet would be preferable to altering the existing parapet.

RIVER ROAD BRIDGE

(no ConnDOT number)

Air Line Railroad (abandoned) over River Road, Colchester

Description: 1887, 1-span masonry-arch.

Similar Structures in Preservation Plan: There are seven other 19th-century masonry-arch bridges in the Plan that originally carried a railroad: 3682, 1617, 1079 and four other bridges that carry or cross public rights-of-way but do not have ConnDOT bridge numbers -- Field Point Road and Arch Street in Greenwich, Kinsman Road Extension in Lisbon, and Middle Haddam Road in Portland.

Historical Significance: A well-preserved example of the heavy masonry construction, with finely finished stone throughout, employed in 19th-century railroad bridges; important historical association with the New Haven Railroad's consolidation of rail transportation in the state.

Preservation Planning:

General Considerations: The railroad is abandoned, and the only function served currently by the bridge is to carry a buried sewer line over River Road. The crossing is located in Salmon River State Forest, and apparently limited as a practical matter to recreational use. This bridge is listed individually on the National Register.

Structural Rehabilitation: Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

BRIDGE NO. 5144

Wolford Hill Road over Sandy Brook, Colebrook

Description: 1914, steel Warren pony truss, 1 span; built by Berlin Construction Co. Presently supported on steel beams installed below the deck in 1979; original floor beams and stringers were removed, but lower chord and floor joints were left in place.

Similar Structures in Preservation Plan: 4622, 4727

Historical Significance: Among the scarce and declining examples of the town-built highway trusses of the early 20th century.

Preservation Planning:

General Considerations: Structure is effectively preserved by the 1979 secondary structural system. Alternative crossing available approximately one mile downstream.

Structural Rehabilitation: Replacement of the 1979 beams to increase load capacity would not impair the extant historic integrity.

Bypass: There are no buildings close to the crossing, but the ground slopes up sharply to the east of Sandy Brook, perhaps impairing the feasibility of relocating the crossing. If close-proximity bypass is considered, some provision should be made for continuing maintenance of the historic structure.

Relocation: Its small size makes this bridge a good candidate for relocation to a park or trail crossing.

Widening: At only 14' width, it is conceivable that widening to the standard of 28' might be recommended for this crossing in the future. Up to that roadway width, the trusses should remain in place. On any wider a bridge, the trusses might take on a ludicrous appearance, as vestigial ornamentation on a thoroughly modern structure.

BRIDGE NO. 4619

Village Hill Road over Ten Mile River, Columbia-Lebanon

Description: c.1870, masonry-arch bridge with rough-faced cut ring stones and rubble spandrels; later stonework on abutments and approaches.

Similar Structures in Preservation Plan: 1401, 3671, 2241, 4700, 4704, 3793, 4839, 3879, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Well-preserved example of the vernacular masonry arch of the 19th century; associated with small 19th-century processing enterprises immediately upstream.

Preservation Planning:

General Considerations: This is a rural location that seems unlikely to demand upgraded road facilities.

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring, barrel and spandrels are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

Widening: Widening to one side could cause the loss, or at least the loss of visibility, of one spandrel and parapet, and may well constitute an adverse effect. Leaving one side fully intact may, however, constitute acceptable mitigation.

Bypass: The presence of intersections on either side of the bridge would complicate this option.

BRIDGE NO. 560

Routes 7 and 4 over Housatonic River, Cornwall-Sharon.

Description: 1930, 6 open-spandrel concrete arches with approach spans.

Similar Structures in Preservation Plan: 455, 603, 1132

Historical Significance: The bridge is a large and impressive example of open-spandrel concrete arch.

Preservation Planning:

General Considerations: As this bridge lacks its original 1930s railings, one of the chief preservation issues is rendered moot. The bridge's survival depends upon whether it can serve the needs of Routes 4 and 7 as a two-lane bridge. Continued extension of an enlarged Route 7 will demand some planning to allow the retention of the bridge. As with all concrete arches, complete avoidance of moisture penetration (run-off control, drains, roadway membrane) and reduced road salt will prolong the life of the bridge.

Structural Rehabilitation: Most components of arches such as this can be continually renewed in kind. Care should be taken to duplicate all decorative aspects such as paneling on the piers, column capitals, modillions, etc. The concrete pedestrian stairs should also be retained, if practical, since they were part of the original design and help to document subtle changes in priorities.

Widening: Almost by definition, widening an open-spandrel arch means constructing a parallel bridge; the only question is on which side and how far away. Building the parallel span as far away as feasible will preserve the visibility and setting of the existing arch.

Bypass: It is likely that the existing bridge could serve increased traffic needs through the use of a parallel bridge to carry one direction of traffic. However, if that proves unfeasible, planning should seek a by-pass of the bridge or a reduced role (such as carrying Route 4 only to a new intersection west of the river, with a separate Route 7 crossing).

BRIDGE NO. 1338

Route 128 over Housatonic River, West Cornwall, Cornwall-Sharon

Description: 1841, timber, Town lattice truss; Queen post truss added as secondary support c.1887; center pier added 1924. Traffic load is now borne by a hidden steel-deck structure installed in 1973, a project that won a national bridge-preservation award from FHWA.

Similar Structures in Preservation Plan: 4453

Historical Significance: One of two Town-lattice trusses under ConnDOT jurisdiction.

Preservation Planning:

General Considerations: Special Act 61-314 of the Connecticut General Assembly mandates that the Highway Department "maintain" this bridge in perpetuity. It further stipulates that if it "becomes necessary to discontinue use . . . for highway purposes . . . the Highway Commissioner shall construct a new highway bridge but shall continue to maintain the covered bridge."

Structural Rehabilitation: Renewing the hidden steel structure that carries the load will not affect historic integrity, as long as impact on the timber elements is avoided in the design and implementation of any rehabilitation.

Bypass: Topography and building density could limit the feasibility of this option.

Relocation: The length (242') of this bridge would make relocation very expensive. Also, disassembly of the timber truss would likely involve the loss of original fabric that is currently protected from the elements and not impacted by traffic load. Moreover, the bridge is very closely identified with this location, and its loss would likely be considered a highly adverse visual impact on the area. Finally, relocation might be considered a violation of Special Act 61-314.

BRIDGE NO. 4622

Flanders Road over Willimantic River, Coventry-Mansfield

Description: 1914, steel Warren pony truss, 2 spans; built by American Bridge Co.

Similar Structures in Preservation Plan: 4727, 5144

Historical Significance: Among the scarce and declining examples of the town-built highway trusses of the early 20th century.

Preservation Planning:

General Considerations: Alternative crossing available approximately one-half mile upstream. Width (13') appears to be the most likely reason for any project to improve the crossing. As of February 13, 1991, the towns have requested a grant from ConnDOT to replace the bridge.

Structural Rehabilitation: Patch plates, bolts in place of rivets, and downward extension of the floor joints (apparently to accommodate deeper stringers) have already modified this bridge. Further selective patching, and in-kind replacement of members, would not materially affect the structure's integrity but would not address width.

Widening/Secondary Structure: Installation of a beam system below the deck, either to provide two full lanes or to improve load capacity, need not compromise the historic integrity; outer ends of floor beams, including floor joints should be retained as evidence of prior load-bearing system and to hide new material.

Bypass: Lack of nearby buildings and the generally level floodplain topography appear to make close-by bypass a viable option. If bypass is considered, some provision should be made for continuing maintenance of the historic structure.

Relocation: Because the spans are but 35' long, they are excellent candidates for relocation, either separately to short crossings or together to a longer crossing.

BRIDGE NO. 4125

Crosby Street over Padanaram Brook, Danbury

Description: 1899, arch bridge of ashlar masonry, 2 spans, plaque

Similar Structures in Preservation Plan: 979, 1850, 1852

Historical Significance: Location in central business district is reflected in both the fine masonry and the substantial construction.

Preservation Planning:

General Considerations: The blocks to the south of the bridge were part of an urban renewal project involving demolition and, to a lesser extent, new construction. The roads were also apparently upgraded during renewal. The survival of this bridge through that episode reflects both its ample width (32') and, apparently, load capacity. Thus this bridge would seem to be a good candidate for survival.

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring and spandrel of the north side are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

BRIDGE NO. 4992

Rings End Road over Gorhams Pond, Darien

Description: Three-span concrete arch with rough-hewn stone rings and random-ashlar spandrels, wing walls, and railing with granite coping, 1930. Exceptionally scenic, tidal-pond setting.

Similar Structures in Preservation Plan: concrete arches of similar date and level of ornamental detail include Bridges Nos. 1591, 1537, 5041, 3645, 948, 992, 963, 4166, and 1117.

Historical Significance: Significant as an example of the monumental arched bridges of the early 20th century, somewhat unusual in that it is not in an urban setting.

Preservation Planning:

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of exterior damage should seek to duplicate the existing stonework as closely as possible, and replacement mortar should match the historic mortar in color, composition (especially the lime-cement ratio), and joint tooling. Sealers on historic stonework are not recommended: impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: This bridge primarily has interest because of its stonework. Massive structural replacement of the arch would diminish its integrity, but much of the bridge's significance would remain if the ringstones, spandrels, wing walls and parapets were kept intact.

Widening: The bridge presently has a fairly narrow roadway width, 20'. If greater capacity were needed, it would be possible to moderately widen the bridge (presumably on the downstream side) without destroying its integrity or scenic qualities provided the widening was accompanied by a completely accurate rebuilding of the stone arch ring, spandrels, wing walls and parapet on the widened side.

Guardrail: The roadway presently relies on the parapets for roadway protection. If additional protection were required, guardrail installed between the roadway and sidewalks would be best from a historic preservation point of view, but might not be desirable given the bridge's narrowness. Because the parapets are a prominent visual feature, they should be kept unobscured as much as possible.

Bypass: Close-by bypass or use of a parallel span to carry one direction may be possible, but it would impact on the visual qualities of the bridge and setting.

BRIDGE NO. 1138
(EAST HADDAM SWING BRIDGE)

Route 82 over Connecticut River, East Haddam - Haddam

Description: Pin-connected Warren through truss swing span, riveted Pennsylvania through-truss approach span, deck-truss approach span; built 1913. The operator's house and guardrail are recent replacements for the original.

Similar Structures in Preservation Plan: no other swing bridges of this period remain in the state. The earlier Saugatuck bridge (1884, No. 1349) and the later and smaller 1924 Pleasure Beach Bridge in Bridgeport (1924, Bridge No. 4455) are the only other highway swing bridges in the state.

Historical Significance: Major swing bridge (456' swing span) by one of America's leading bridge engineers of the period, Alfred Boller. The larger approach span is in itself significant as one of the longest examples of early 20th century truss construction in the state.

Preservation Planning:

General Considerations: This bridge was recently rehabilitated, including a new deck and structural reinforcement to the eyebars. Presumably this work has addressed the load requirements of the structures for some time to come. (Originally the bridge carried a streetcar line as well as motor-vehicle traffic).

Mechanism: Whatever remains of original components of the drive mechanism, end locks, wedges, etc. should be preserved intact as much as possible, replacing them in kind as needed when they wear out. The design of these details actually provided much of the challenge in building a movable bridge. If it becomes necessary to substitute modern mechanical components for historical ones which no longer are capable of repair or no longer function with the higher dead load of the bridge, record photographs of the existing components should be made.

Maintenance: Like any steel bridge, this one will have its life extended by reduction of road salt, periodic washing, and a regular paint cycle.

Structural Rehabilitation: Selective replacement of members with like material will have little impact on the bridge's integrity. Similarly, the pinions and drive gears can be replaced in kind, provided the original materials and dimensions are respected. The choice of deck material is not of great historical importance.

Widening: Not practical, either through modification of the existing span or construction of parallel span.

Bypass: Difficult given the existing settlement pattern. Navigational considerations may make it difficult to justify bypassing this bridge and leaving the old one in place as a river obstruction.

Relocation: Not practical.

BRIDGES NO. 1603, 1604, 1605

(DEVILS HOPYARD PARK BRIDGES)

Route 434 (Devils Hopyard Road) over brooks, East Haddam.

Description: three nearly identical 1930s fieldstone arches.

Similar Structures in Preservation Plan: 5217, 5218, 1608

Historical Significance: The bridges are examples of the park bridges of the 1920s and 1930s, typified by their rustic stone masonry. The bridges have added significance as a C.C.C./W.P.A. project.

Preservation Planning:

General Considerations: Route 434 is a through road bisecting Devils Hopyard State Park. Nevertheless, it appears to be a relatively low-volume, low-speed route, so it is unlikely that traffic needs will require the replacement or modification of these bridges in the near future. The bridge's preservation is therefore a matter of maintenance common to all masonry bridges: control of moisture and prompt repair of eroded surfaces. These issues appear to have been successfully addressed in the recent rehabilitation, which installed a waterproof membrane beneath the road, improved drains, better channeled roadway runoff, replaced missing mortar, and corrected scoured footings.

Structural Rehabilitation: Stone arches rarely require structural upgrading, which by definition means taking down and re-erecting the entire bridge. Before such a drastic step is taken, supporting the roadway on a concrete slab imbedded above the stone arch should be investigated. The only effect of this technique would be to raise slightly the level of the roadway relative to the parapets.

Bypass: There would seem to be adequate room to re-align the road and by-pass the bridges.

Widening: The rustic quality of these bridges is not compatible with a roadway wider than two lanes. However, if some additional width were needed, widening in concrete, with re-erection of a spandrel and parapet in similar stonework, would not compromise the significance of the bridge, which primarily derives from the appearance of its stonework.

BRIDGE NO. 4496

Forbes Street over Hockanum River, East Hartford

Description: Large shallow concrete arch faced with pink granite ashlar. West pipe rail appears early if not original, east rail is modern.

Similar Structures in Preservation Plan: Other stone-faced concrete arches of the period are 4214, 977, and 3808.

Historical Significance: Significant as an early example of concrete-arch construction (second oldest in survey) and as an example of the "City Beautiful" arches of the early 20th century.

Preservation Planning:

General Considerations: This bridge was built when Church Street/Forbes Street was the primary road leading to Burnside. Now the causeway to the east serves that function, so this is a large bridge on a relatively minor street.

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of exterior damage should seek to duplicate the existing stonework as closely as possible, and replacement mortar should match the historic mortar in color, composition (especially the lime-cement ratio), and joint tooling. Sealers on historic stonework are not recommended: impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: This bridge has both intrinsic technological interest as an early concrete structure and historic interest deriving from its ornate stonework. Massive structural replacement of the arch would diminish its integrity, but much of the bridge's significance would remain if the spandrels were kept intact. Any removal of historic concrete should be accompanied by photographs showing a profile of the concrete and the reinforcement system.

Widening: Widening the bridge would destroy its integrity unless it was accompanied by rebuilding the stonework spandrel on the widened side.

Guardrail: Both the old railing and the replaced railing appear to offer snagfree surfaces. If it is determined that greater protection is required, metal guardrail attached to the railings would compromise their appearance only slightly, and no more than the present chain-link fence.

Bypass: Industrial and commercial buildings at this location make bypass complicated at this site, especially for a much wider roadway. Constructing a parallel span (downstream would seem most feasible) would allow this bridge to carry one direction of traffic.

BRIDGE NO. 1524

STILES BRIDGE

Route 191 over Scantic River, East Windsor

Description: 1925, steel Warren pony truss, 1 span; fabricated by Berlin Construction Co.

Similar Structures in Preservation Plan:

Trusses, 1921 and Later: 1496, 3788, 562, 1649, 1487, 1561, 4434, 507, 1415, 349

Warren Pony Trusses, 1921 and Later: 4434

Berlin Construction Co. Bridges, 1921 and Later: 1561, 4434

Historical Significance: Built under the state Highway Department's trunk-line bridge program, it typifies the numerous steel pony trusses the department erected on the highways of Connecticut. Berlin Construction was the state's only significant bridge fabricator in the 20th century.

Preservation Planning:

General Considerations: The steel orthotropic deck was installed during rehabilitation in 1985. Though this installation necessitated deepening the floor beams, and the project also placed a new guardrail on the bridge, the historic integrity was not substantially compromised by the rehabilitation. It is assumed that the alignment and other functional characteristics were deemed acceptable prior to that project.

Structural Rehabilitation: Selective patching and in-kind replacement of members would not compromise the structure's historic integrity.

BRIDGE NO. 4500

Melrose Road No. 2 over Scantic River, East Windsor

Description: 1888, wrought-iron lenticular pony truss, 1 span; closed to traffic.

Similar Structures in Preservation Plan: 2212, 4534, 4575, 5038, 5065, 5159, 5191

Historical Significance: This bridge is significant as one of eight Berlin Iron Bridge Co. lenticular pony trusses in the Preservation Plan. It retains all the characteristic details, such as nut-connected portal joints, tapered floor beams, relatively light built-up web members, and pinned panel joints. The bridge is closed to traffic, and effectively bypassed.

Preservation Planning:

General Considerations: Though closed to vehicular traffic, this bridge apparently remains under ConnDOT jurisdiction based on its listing in the state Bridge Log. As such, it may present a good opportunity to preserve in place a lenticular pony truss without impacting present-day traffic concerns. Even if retained for pedestrian use only, some work will be necessary to restore the timber deck, which is severely deteriorated.

Structural Rehabilitation: This is not a likely option unless future state or town plans call for reopening the roadway; no such plans are known to exist at present. If vehicles must once again use the bridge, replacement of deteriorated iron members with like members in steel should be investigated as a means of allowing an increase in load capacity. However, the problem of narrow width would remain.

Relocation: The small size of the bridge makes it a good candidate for relocation as a pedestrian or park bridge. Also, the significance of this truss is based more on its intrinsic technology than on its location. The location, however, is not completely without preservation significance, because this is the only span of its type in the north-central region of the state.

BRIDGE NO. 1487

Route 177 over Farmington River, Unionville, Farmington

Description: 1939, steel Warren (with verticals) through truss, 1 span; fabricated by Phoenix Bridge Co. Later deck and railings.

Similar Structures in Preservation Plan:

Trusses, 1921 and Later: 1496, 3788, 562, 1649, 1524, 1561, 4434, 507, 1415, 349

Warren Trusses, 1921 and Later: 562, 4434, 1524

Historical Significance: Typifies truss-bridge construction during the automotive age. Built under the state Highway Department's trunk-line bridge program.

Preservation Planning:

Structural Rehabilitation: Rehabilitation project completed in 1990 replaced the concrete deck with a new pre-cast concrete deck. Continued replacement of deck material would not affect the historic qualities of the bridge. Additional selective patching and in-kind replacement of truss members would not compromise the structure's historic integrity.

Bypass: Apparently impossible at this tightly constrained crossing.

Relocation: Span length (220') and contextual significance appear to preclude this option.

BRIDGE NO. 1401

Route 160 over Roaring Brook, South Glastonbury, Glastonbury

Description: c.1870, brick arch with quarry-faced ring stones, and rubble spandrels and parapet, 2 spans.

Similar Structures in Preservation Plan: 4619, 3671, 2241, 4700, 4704, 3793, 4839, 3879, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Well-preserved example of 19th-century vernacular masonry bridge construction. Significant association with the rebuilding effort that followed the devastating flood of 1869.

Preservation Planning:

General Considerations: This bridge was rehabilitated in 1987 by rebuilding the arch barrel in brick, on an unobtrusive concrete footing.

Structural Rehabilitation: If further rehabilitation is ever necessary, it should be as unobtrusive as the recent work. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

BRIDGE NO. 3671

Naubuc Avenue over Porter Brook, Glastonbury

Description: 1871, small masonry arch with squared-up stone in the barrel, rings, spandrels and parapets.

Similar Structures in Preservation Plan: 4619, 1401, 2241, 4700, 4704, 3793, 4839, 3879, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Well-preserved example of 19th-century vernacular masonry bridge construction. Significant association with the rebuilding effort that followed the devastating flood of 1869.

Preservation Planning:

General Considerations: Naubuc Avenue in the vicinity of this bridge consists of an embankment raised above seasonally flooded wetlands, which would complicate and perhaps prevent any plans for widening or bypass.

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring, barrel and spandrels are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

BRIDGE NO. 3674

Byram Road over Metro North Railroad, Greenwich

Description: 1893, steel Warren pony truss, 1 span.

Similar Structures in Preservation Plan: 3846, 3852

Historical Significance: As part of one of the nation's earliest systematic truss-bridge construction programs, this span has high intrinsic significance. Its many archaic details include single-ply members with no flanges, outboard sway bracing, and portal joints where all the members do not meet around a common point. It is also important as part of Connecticut's most critical rail corridor.

Preservation Planning:

General Considerations: Current planning calls for new floor beams and additional structural material to be added to the diagonals. This work will affect the historic qualities of the truss, and should be preceded by Historic American Engineering Record photographic and written documentation.

Bypass: The densely built-up character of this location appears to preclude close-by bypass.

Relocation: The high intrinsic significance and relatively short length make this bridge a good candidate for relocation to a park or trail setting.

BRIDGE NO. 3846

Drinkwater Place over Metro North Railroad, Greenwich

Description: 1895, steel Warren pony truss, 1 span.

Similar Structures in Preservation Plan: 3674, 3852

Historical Significance: As part of one of the nation's earliest systematic truss-bridge construction programs, this span has high intrinsic significance. Its many archaic details include single-ply members with no flanges and outboard sway bracing. It is also important as part of Connecticut's most critical rail corridor.

Preservation Planning:

General Considerations: Current planning calls for new floor beams and additional structural material to be added to various members. This work will affect the historic qualities of the truss, and should be preceded by Historic American Engineering Record photographic and written documentation.

Bypass: The densely built-up character of this location appears to preclude close-by bypass.

Relocation: The high intrinsic significance and relatively short length make this bridge a good candidate for relocation to a park or trail setting.

BRIDGE NO. 5011

Shore Road #1 over Horseneck Brook, Greenwich

Description: 1905, 2-span ashlar-masonry arch with round end piers surmounted by finials of embedded spheres.

Similar Structures in Preservation Plan: There are four other simple, 20th-century masonry-arch bridges in this Plan: 900, 4149, and two other bridges that carry public highways but do not have ConnDOT bridge numbers -- Hartford Road in Manchester and Arch Street in Putnam.

Historical Significance: Well-preserved example of a fine masonry bridge of the early 20th century, whose appearance reflects its location near the railroad depot and the commercial district.

Preservation Planning:

General Considerations: Field Point Road passes under I-95 immediately south of this bridge, negating any feasibility of bypass.

Structural Rehabilitation: Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

Widening. Roadway width of 21' may bring pressure on the bridge in the future. Widening is not possible to the west, where the limit of the roadway is defined by the abutment of the I-91 overpass. Widening to the east would probably constitute an adverse effect, but making the new structure as unobtrusive as possible and replacing all the stonework may be accepted as mitigation.

FIELD POINT ROAD BRIDGE

(no ConnDOT number)

Metro North Railroad over Field Point Road, Greenwich

Description: 1894, 1-span masonry arch.

Similar Structures in Preservation Plan: There are seven other 19th-century masonry-arch bridges in the Plan that originally carried a railroad: 3682, 1617, 1079 and four other bridges that carry or cross public rights-of-way but do not have ConnDOT bridge numbers -- River Road in Colchester, Arch Street in Greenwich, Kinsman Road Extension in Lisbon, and Middle Haddam Road in Portland.

Historical Significance: A well-preserved example of the heavy masonry construction, with finely finished stone throughout, employed in 19th-century railroad bridges; important historical association with the New Haven Railroad's major upgrade of its New York Division (between New York and New Haven) in the 1890s.

Preservation Planning:

General Considerations: This bridge apparently has ample width (40'). Any future consideration on the part of ConnDOT for its replacement would likely derive from the vertical roadway clearance (14' in the center of the arch, 9'-1" at the sides), or from major reconfiguration of the present traffic system that features intersections on either side of the bridge. Any action addressing these matters would probably threaten the bridge.

Structural Rehabilitation: Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

ARCH STREET BRIDGE

(no ConnDOT number)

Metro North Railroad over Arch Street, Greenwich

Description: c.1870 masonry arch with cut ring stones, rubble spandrels, barrel and wing walls; an extension to the north, built in 1895, features ashlar masonry throughout.

Similar Structures in Preservation Plan: There are seven other 19th-century masonry-arch bridges in the Plan that originally carried a railroad: 3682, 1617, 1079 and four other bridges that carry or cross public rights-of-way but do not have ConnDOT bridge numbers -- River Road in Colchester, Field Point Road in Greenwich, Kinsman Road Extension in Lisbon, and Middle Haddam Road in Portland.

Historical Significance: Technologically, this bridge is a highly interesting illustration of the evolution, over 25 years, of the New Haven Railroad's masonry techniques for small bridges from largely rubble to full ashlar. Also represents the two major reconstruction episodes on the state's most important corridor -- following the consolidation that created the railroad in the early 1870s, and the four-track upgrade of the 1890s.

Preservation Planning:

General Considerations: Any future consideration on the part of ConnDOT for its replacement would likely derive from the vertical roadway clearance (10'-9"), roadway width (14'), or major reconfiguration of the present traffic system that features an intersection and rotary immediately south of the bridge. Any action addressing these matters would probably threaten the bridge.

Structural Rehabilitation: Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

BRIDGE NO.362
(MYSTIC RIVER BRIDGE)

Route 1 over Mystic River, Groton-Stonington

Description: Brown-patent overhead-counterweight balance-beam bascule (deck girder), girder approaches, replaced railing on bascule, operator's house, commemorative plaque; completed in 1922.

Similar Structures in Preservation Plan: Other bascules include Bridges No. 327, 363, 3637, 4251, 4252.

Historical Significance: Large and well-preserved example of an early 20th-century movable bridge, based on one of the period's major patented designs.

Preservation Planning:

Mechanism: The drive mechanism of the bridge should be preserved intact as much as possible, replacing components in kind as needed when they wear out. The electrical motors and controls have probably been replaced or modified and at any rate are less of an intrinsic part of the design than the gearing and structure itself.

Maintenance: Like any steel bridge, this one will have its life extended by reduction of road salt, periodic washing, and a regular paint cycle. The approach spans are of secondary significance to the bascule itself, but their useful life will also be shortened if not maintained.

Structural Rehabilitation: Replacement of members with like material will have little impact on the bridge's integrity. Thus it would preserve the bridge's historic value to replace the bascule beams with identical riveted plate-girder components, but not welded-up beams. Similarly, the pinions, drive gears, bull wheels, linkages, and counterweights can be replaced in kind, provided the original materials and dimensions are respected. The choice of deck material is not of great historical importance.

Widening: From a practical point of view, widening this structure can only be done by constructing a modern parallel span or replacing the bridge altogether. Building density in this congested district would seem to make widening, parallel span, or bypass extremely difficult.

Relocation: Not practical.

BRIDGE NO. 2241

Route 27 over Whitford Brook, Old Mystic, Groton-Stonington

Description: c.1870, small masonry arch bridge with cut ring stones and rubble spandrels; widened to the north by means of a concrete slab.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 4700, 4704, 3793, 4839, 3879, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Exemplifies traditional, 19th-century masonry bridge-building technology. Contextual significance related to the growth of Mystic Village.

Preservation Planning:

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring and spandrel of the south side are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

Widening: Any further widening should be to the north.

Bypass: This is not a feasible option in this densely built-up village center.

BRIDGE NO. 977

Route 44 (Albany Avenue) over Park River North Branch, Hartford

Description: 1906 concrete arch with brownstone ringstones and trap-rock exterior facing, including stone parapet/railing.

Similar Structures in Preservation Plan: Other early "City Beautiful" concrete bridges include Bridges Nos. 4214, 4496, and 3808.

Historical Significance: Significant as an early concrete arch and as an example of the ornate urban arches of the early 20th-century.

Preservation Planning:

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of exterior damage should seek to duplicate the existing stonework as closely as possible, and replacement mortar should match the historic mortar in color, composition (especially the lime-cement ratio), and joint tooling. Sealers on historic stonework are not recommended: impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: This bridge has both intrinsic technological interest as an early concrete structure and historic interest deriving from its ornate stonework. Massive structural replacement of the arch would diminish its integrity, but much of the bridge's significance would remain if the spandrels were kept intact. Any removal of historic concrete should be accompanied by photographs showing a profile of the concrete and the reinforcement system.

Widening: Given the present roadway width (46'), it is unlikely that additional width will be required. Widening the bridge would destroy its integrity unless it was accompanied by a completely accurate rebuilding of the stonework spandrel and parapet on the widened side.

Guardrail: The roadway presently relies on the parapets for roadway protection, and they would seem to serve adequately in terms of crash strength and freedom from snag points. If additional protection were required, the relatively high parapets would make an attached guardrail less visually obtrusive than usual. Alternatively, guardrail could be installed between the roadway and sidewalk. Because the parapets are a prominent visual feature, they should be kept unobscured.

Bypass: Building density and the established street pattern will make it difficult to bypass this structure with a wide roadway.

BRIDGE NO. 979

Route 44 over Amtrak Railroad, Hartford

Description: 1871, substantial 2-span brick arch with cut-brownstone rings and spandrels; Classically-derived pilasters.

Similar Structures in Preservation Plan: 4125, 1850, 1852

Historical Significance: A major work of engineering (300' long along the tracks) from the early years of railroad consolidation in Connecticut.

Preservation Planning:

General Considerations: Substantial width (52' roadway) and, apparently, load capacity, make this bridge a good candidate for retention.

Structural Rehabilitation: Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

BRIDGE NO.980A
(BULKELEY BRIDGE)

I-84 over Connecticut River, Hartford - East Hartford

Description: Nine stone-arch spans, of pink and gray granite ashlar, with simple stone parapet and niches with memorial tablets. Built 1908, widened in concrete on the north side as part of the construction of I-84 in the 1960s.

Similar Structures in Preservation Plan: None of this magnitude.

Historical Significance: Significant as a massive work of engineering, the largest stone-arch bridge in Connecticut, a major factor in the spatial development of Hartford and East Hartford in the early 20th century, and the largest and most expensive example of "City Beautiful" bridge in the inventory.

Preservation Planning:

General Considerations: Given the construction of the original bridge from huge, precisely mated blocks of granite, with the whole bonded with a thick layer of concrete laid over the top of the stone, it is difficult to conceive of why this bridge will ever need major structural work. Moisture penetration is detrimental to stone arches, however, and the run-off control and drainage system of the bridge should be reviewed periodically for effectiveness. Should it become necessary to repair any of the stonework, care should be taken to matching the historic stone and mortar as closely as possible. Structural rehabilitation of the concrete arches will not affect the bridge provided that the north-side stone work, parapet, and piers are kept intact.

Widening: The bridge was already widened once, with re-erection of the stonework on the north side. Additional widening on this side would not affect the integrity of the bridge provided that the stonework was again reassembled. If the expense of such an undertaking was prohibitive, it would be far preferable to construct a parallel free-standing bridge to the north rather than cut into the historic stonework as part of a widening project.

Guardrail: Presently the railing separating the roadway from the sidewalk on the south side and the north parapet serve as roadway protection. Should additional protection be necessary, it is important to obscure these decorative features as little as possible.

Bypass: Not practical.

BRIDGE NO. 1626

Main Street over Whitehead Highway, Hartford

Description: 1833, ashlar-masonry bridge

Similar Structures in Preservation Plan: none

Historical Significance: A substantial bridge for any period, with greatly heightened significance as the oldest bridge in the Preservation Plan. Historically significant for its role in linking the two sides of Hartford on the opposite sides of the Park River. Among the longest masonry spans in the country when it was built.

Preservation Planning:

General Considerations: The east side of the bridge has been obscured by a new structure. Preserving the remaining side should be accorded high priority.

Structural Rehabilitation: Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

BRIDGE NO. 3781

Walnut Street over Amtrak, Hartford

Description: 1907, steel double-intersection Warren truss, 1 span; built by Boston Bridge Works; recent alterations to floor system and main diagonals.

Similar Structures in Preservation Plan: 3752, 3998

Historical Significance: Part of the New Haven Railroad's system-wide upgrade in the early 20th century; one of three essentially similar structures built by the railroad in this period, two of which were fabricated by Boston Bridge Works. This bridge eliminated a dangerous road crossing. In engineering history, it is significant as example of the heavy truss construction favored by railroads.

Preservation Planning:

Structural Rehabilitation: Because of the extent of existing repairs to floor system and diagonals, additional extensive patching and replacement of members will seriously compromise the historic integrity of the bridge.

Bypass: Probably not practical given the existing street pattern.

Relocation: Not a meaningful option due to the size of the bridge and the historic significance of its location.

BRIDGE NO. 4453

Bulls Bridge Road over Housatonic River, Kent

Description: 1842, timber, Town lattice truss; Queen post truss added as secondary support in 19th century. Traffic load is now borne by steel beams installed below the deck in 1969.

Similar Structures in Preservation Plan: 1338

Historical Significance: One of two Town-lattice trusses under ConnDOT jurisdiction.

Preservation Planning:

Structural Rehabilitation: Renewing the steel beams that carry the load will not affect historic integrity, as long as impact on the timber elements is avoided in the design and implementation of any rehabilitation.

Bypass: Steep gorge (downstream) and headgates to hydroelectric canal (upstream) limit the feasibility of this option.

Relocation: The size (80') and high intrinsic significance make this bridge a reasonable candidate for relocation to a park or trail setting. However, disassembly of the timber truss would likely involve the loss of original fabric that is currently protected from the elements and not impacted by traffic load. Moreover, the bridge is very closely identified with this location, and its loss might be considered a highly adverse visual impact on the area.

BRIDGE NO. 4700

Peep Toad Road over Whetstone Brook, Killingly

Description: c.1850, masonry arch built of fieldstone rubble, 2 spans (each 10'long); adjacent a c.1850 cotton mill.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 2241, 4704, 3793, 4839, 3879, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Exemplifies traditional, 19th-century masonry bridge-building technology. Contextual significance related to the growth of textile production in the vicinity.

Preservation Planning:

General Considerations: The mill and surrounding property, including this bridge, constitute a small National Register-listed district. Any work on the bridge would have to consider impacts on the district as well as the bridge.

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring and spandrel are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Neither plan would address width or alignment. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

Bypass: Bypass appears to be feasible to the east; the mill stands west of the bridge.

Widening: Widening to one side could cause the loss, or at least the loss of visibility, of one spandrel and parapet, and may well constitute an adverse effect. Leaving one side fully intact may, however, constitute acceptable mitigation.

BRIDGE NO. 4704

Attawaugan-Ballouville Road over Five Mile River, Ballouville, Killingly

Description: c.1860, masonry-arch bridge made of quarry-faced blocks, recent railing.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 2241, 4700, 3793, 4839, 3879, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Exemplifies traditional, 19th-century masonry bridge-building technology. Contextual significance related to the growth of textile production in the vicinity.

Preservation Planning:

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring and spandrel are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Neither plan would address width or alignment. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

Bypass: Bypass appears to be feasible to the south, where no buildings stand adjacent to the bridge.

Widening: Widening to one side could cause the loss, or at least the loss of visibility, of one spandrel and parapet, and may well constitute an adverse effect. Leaving one side fully intact may, however, constitute acceptable mitigation.

BRIDGE NO. 1132

Route 80 over Hammonasset River, Killingworth-Madison.

Description: 1934, open-spandrel concrete arch with approach spans; railing of square balusters.

Similar Structures in Preservation Plan: 455, 560, 603

Historical Significance: The bridge is a well-preserved example of open-spandrel concrete arch.

Preservation Planning:

General Considerations: The width and alignment of this bridge appear adequate to the needs of Route 80 for the foreseeable future. Its continued utility, therefore, primarily depends on avoidance of moisture penetration (run-off control, drains, roadway membrane) and reduced road salt.

Railing: This one of few bridges of the period to retain its distinctive original open-baluster railing. This is a valuable feature which helps indicate the bridge's period of origin. If it becomes necessary to upgrade the railing to current standards, the present railing should be retained in place and allowed to be as visible as possible. Running the existing metal guardrail the length of the bridge would be preferable from an historic preservation point of view to filling in the railing with a Jersey-barrier type guardrail as was done on some of the Merritt Parkway bridges.

Structural Rehabilitation: Most components of arches such as this can be continually renewed in kind. Care should be taken to duplicate all decorative aspects such as the arches between the piers, the column capital moldings, etc.

Widening: Almost by definition, widening an open-spandrel arch means constructing a parallel bridge; the only question is on which side and how far away. Building the parallel span as far away as feasible will preserve the visibility and setting of the existing arch.

Bypass: It is likely that the existing bridge could serve increased traffic needs through the use of a parallel bridge to carry one direction of traffic. However, if that proves unfeasible, planning should seek a by-pass of the bridge. The setting would seem to offer sufficient room for by-pass.

KINSMAN ROAD EXTENSION BRIDGE

(no ConnDOT number)

Providence and Worcester Railroad over Kinsman Road Extension, Lisbon

Description: c.1850, ashlar-masonry arch bridge.

Similar Structures in Preservation Plan: There are seven other 19th-century masonry-arch bridges in the Plan that originally carried a railroad: 3682, 1617, 1079 and four other bridges that carry or cross public rights-of-way but do not have ConnDOT bridge numbers -- River Road in Colchester, Field Point Road and Arch Street in Greenwich, and Middle Haddam Road in Portland.

Historical Significance: Among the earliest bridges in this Plan, built as part of the original construction of the Hartford, Providence and Fishkill Railroad; a well-preserved example of the heavy masonry construction, with finely finished stone throughout, employed in 19th-century railroad bridges.

Preservation Planning:

General Considerations: Any future consideration on the part of ConnDOT for its replacement would likely derive from the vertical roadway clearance (10'-9"), roadway width (14'), or major reconfiguration of the present traffic system that features an intersection and rotary immediately south of the bridge. Any action addressing these matters would probably threaten the bridge.

Structural Rehabilitation: Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

Bypass: Lack of heavy building density nearby, and the fact that the railroad was carried on a raised embankment, raise the potential feasibility of cutting an alternative passage through the embankment rather than impacting the historic bridge.

BRIDGE NO. 3793

North Main Street over Hockanum River, Manchester

Description: c.1869, 2-span masonry arch with cut ring stones and rubble spandrels; widened to south with steel-beam structure.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 2241, 4700, 4704, 4839, 3879, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Exemplifies 19th-century vernacular masonry bridge construction. Significant association with the rebuilding effort that followed the devastating flood of 1869.

Preservation Planning:

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring and spandrel of the north side are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

Widening: Any further widening should be to the south.

Bypass: Building density would complicate, and perhaps prohibit, this option.

BRIDGE NO. 4149

Spring Street over Birch Mountain Brook, Manchester

Description: 1905, 2-span arch bridge of fieldstone rubble.

Similar Structures in Preservation Plan: There are four other simple, 20th-century masonry-arch bridges in this Plan: 900, 5011, and two other bridges that carry public highways but do not have ConnDOT bridge numbers -- Hartford Road in Manchester and Arch Street in Putnam.

Historical Significance: Early example of the self-consciously rustic bridges that became standard in park construction during the 1920s and 1930s; associated with Case family estates and surrounding designed landscapes.

Preservation Planning:

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as all the ornamental surfaces and features are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Neither of these options would address the roadway width (16'). Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

Widening. Widening would probably constitute an adverse effect, but making the new structure as unobtrusive as possible and replacing all the stonework may be accepted as mitigation.

HARTFORD ROAD BRIDGE

(no ConnDOT number)

Hartford Road over unnamed drainage channel, Manchester

Description: c.1900, ashlar-masonry arch.

Similar Structures in Preservation Plan: There are four other simple, 20th-century masonry-arch bridges in this Plan: 900, 5011, 4149, and one other bridge that carries a public highway but does not have a ConnDOT bridge number -- Arch Street in Putnam.

Historical Significance: Well-preserved example of a fine masonry bridge from the early 20th century; associated with the "Great Lawn," a designed landscape in front of several Cheney family mansions.

Preservation Planning:

General Considerations: Although considered individually eligible, an important factor in evaluating impact on this crossing will be the effect on the nearby complex of early 20th-century mansions and their associated landscape development. Roadway width (28') meets minimum standards. Because the channel is mostly filled in, a culvert buried in the fill could conduct any runoff under the road without impacting on the bridge.

Structural Rehabilitation: Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

Bypass: Planning a bypass would be complicated by the need to consider impact on the adjacent National Historic Landmark District.

BRIDGE NO. 4727

Mt. Hope Road over Mt. Hope River, Mansfield

Description: 1901, steel Warren pony truss, 1 span; built by Berlin Construction Co.

Similar Structures in Preservation Plan: 4622, 5144

Historical Significance: Earliest known bridge fabricated by Berlin Construction Co., the collateral successor to Berlin Iron Bridge Co.; built during the firm's first year of operation. Among the scarce and declining examples of the town-built highway trusses of the early 20th century.

Preservation Planning:

General Considerations: Width (13') appears to be the most likely reason for any project to improve the crossing.

Structural Rehabilitation: Selective patching and in-kind replacement of members would not materially affect the structure's historic integrity. If this option is pursued, a portion (one or two feet) of the outer ends of the floor beams should be left in place, including the original floor joints; this would retain the distinctive technology embodied in these joints, and help to hide the new material.

Bypass: Steep hill to the west and proximity to intersection would complicate close-proximity bypass.

Relocation: Small size and high intrinsic significance make this bridge a good candidate for relocation to a park or trail.

BRIDGE NO. 4839

Cooper Street over Harbor Brook, Meriden

Description: 1892, arch bridge made of ashlar masonry.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 2241, 4700, 4704, 3793, 3879, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Well-preserved, sensitively maintained example of vernacular masonry-arch technology of the 19th century. Important association with citywide improvement program of the 1890s that built many similar bridges, of which this is the best-preserved example.

Preservation Planning:

General Considerations: Ample roadway width (32'), relatively straight alignment, and evidence of careful recent maintenance suggest that this bridge has a good chance of survival without major work. Maintenance on mortar should continue to duplicate existing in mortar composition, tint and tooling.

Structural Rehabilitation: If necessary, embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry is left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect.

BRIDGE NO.524
(ARRIGONI BRIDGE)

Route 66 over Connecticut River, Middletown

Description: Two 600'-long steel trussed arches with cable suspenders for the roadway; 28 girder approach spans. Original sidewalk railing (partly replaced in kind), modern concrete roadway guard barriers. Built in 1938.

Similar Structures in Preservation Plan: None.

Historical Significance: The largest steel arch in the state and a significant and large example of this type of bridge construction. The Arrigoni Bridge received a great deal of attention in technical journals at the time and won a national award for its design from the American Steel Construction Institute.

Preservation Planning:

General Considerations: Like any steel bridge, this one will have its life extended by reduction of road salt, periodic washing, and a regular paint cycle. Some structural rehabilitation is presently under way. Future projects should continue to retain whatever original detail exists, such as the sidewalk railing and award plaque.

Any major project with this bridge must address the overall traffic goals for the area, particularly the improvement of flow between Routes 9 and 66, which presently makes use off Middletown streets. Although an entirely new bridge might be seen as a way of upgrading the interchange, the feasibility of using the present bridge (which was designed for a substantial load) as part of the project should be explored in detail.

Structural Rehabilitation: Replacement of deteriorated structural components with like materials will not affect the historic integrity of the bridge.

Widening: Probably practical only by constructing a parallel span. A parallel-span project could allow this bridge to carry three lanes more comfortably than the present four and could address other aspects of the present bridge, such as the lack of a direct interchange with Route 9 and the curves at either end. In any re-working of this crossing, priority should be placed on retaining the arches themselves; the approach spans are of secondary interest.

BRIDGE NO. 639

CONRAIL over Route 9, Middletown

Description: Two approach spans of the 1910 railroad swing bridge across the Connecticut River carry the rail line over Route 9: a girder span over the south-bound lanes, probably added in 1959, and an original double-intersection Warren through truss over the north-bound lanes.

Similar Structures in Preservation Plan: Unique situation.

Historical Significance: The significance of the through-truss overpass is as a secondary component of the historic railroad swing bridge, which is significant as part of the New Haven Railroad's early 20th-century improvements and as an example of the movable-bridge technology of the period.

Preservation Planning:

General Considerations: The viability of this structure depends upon continued railroad use and maintenance of the swing bridge. Except for possible widening of Route 9, it seems likely that railroad rather than highway needs will impact the bridge.

Structural Rehabilitation: Replacement of deteriorated structural components with like materials in this approach span will not affect the historic integrity of the bridge as a whole.

BRIDGE NO. 1328

New Haven Avenue (Route 162) over Wepawaug River, Milford

Description: 1889, 1-span masonry arch with commemorative structures and detailing; built by John Beattie.

Similar Structures in Preservation Plan: none

Historical Significance: Typical masonry structure of the 19th century, which gains significance because of the prominence of the builder, who supplied the base for the Statue of Liberty; important in the local context for the commemorative value and its central location.

Preservation Planning:

General Considerations: The unusual degree of ornamentation and its central location in the Milford business district has invested this bridge with the status of a local landmark. Its width (28') meets minimum standards. The area is frequently choked with traffic, which may result in some pressure to provide more lanes. It is unclear, however, that altering this one crossing would ease the traffic, because surrounding and approaching streets contribute substantially to the situation. Thus, altering this crossing would not relieve congestion unless the whole business district were also reconfigured.

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as all the ornamental surfaces and features are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

Bypass/Widening. The densely built-up commercial setting, with buildings close to both ends of the bridge, would preclude this option.

BRIDGE NO. 3645
(JEFFERSON BRIDGE)

River Street over Wepawaug River, Milford

Description: Three-span concrete arch with rough-hewn stone rings, pilasters, and random-ashlar spandrels, wing walls, and railing with peaked granite coping, 1934. Park setting in town center. Monument at the northeast corner.

Similar Structures in Preservation Plan: concrete arches of similar date and level of ornamental detail include Bridges Nos. 1591, 1537, 5041, 4992, 948, 992, 963, 4166, and 1117.

Historical Significance: Significant as one of the State Highway Departments more finely detailed projects of the 1920s and 1930s. The elaborate stonework was in response to the Town's request that the aesthetic qualities of the bridge complement the town center.

Preservation Planning:

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of exterior damage should seek to duplicate the existing stonework as closely as possible, and replacement mortar should match the historic mortar in color, composition (especially the lime-cement ratio), and joint tooling. Sealers on historic stonework are not recommended: impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: This bridge primarily has interest because of its stonework. Massive structural replacement of the arch would diminish its integrity, but much of the bridge's significance would remain if the ringstones, spandrels, and parapets were kept intact.

Widening: The bridge's present width of 30' appears adequate for its reduced role as a modest city road; close-by parallel crossings north and south carry most of the through traffic. Additional width could come from elimination of the present parking spaces. If additional roadway were needed, the bridge could be moderately widened without destroying its integrity or scenic qualities provided the widening was accompanied by a completely accurate rebuilding of the stone arch ring, spandrels, wing walls and parapet on the widened side.

Guardrail: The roadway presently relies on the parapets for roadway protection. If additional protection were required, guardrail installed between the roadway and sidewalks would be best from a historic preservation point of view. Because the parapets are a prominent visual feature, they should be kept unobscured as much as possible.

Bypass: Close-by bypass or use of a parallel span to carry one direction may be possible, but it would destroy the visual qualities of the bridge and setting.

BRIDGE NO. 327
(WASHINGTON BRIDGE)

Route 1 over Housatonic River, Milford - Stratford

Description: Double-leaf Brown bascule arched deck-girder span; five six-rib open-spandrel concrete spans; six steel-beam approach spans with false concrete arches; tile-roofed operators' houses; 1989 concrete parapet and railing.

Similar Structures in Preservation Plan: Although there are other movable bridges, there are none that are of this magnitude and historical significance.

Historical Significance: The largest single state highway project at the time of its construction, the bridge has historical significance in the history of Connecticut transportation. It also has technological significance both as a large open-spandrel concrete arch and as a bascule.

Preservation Planning:

General Considerations: This bridge was recently rehabilitated, including a new railing and electrical components. Future would on this bridge should seek to preserve secondary elements, such as the two buildings, which serve to indicate the bridge's period of origin.

Mechanism: Whatever remains of original components of the drive mechanism, toe locks, etc. should be preserved intact as much as possible, replacing them in kind as needed when they wear out. The design of these details actually provided much of the challenge in building a movable bridge. If it becomes necessary to substitute modern mechanical components for historical ones which no longer are capable of repair, record photographs of the existing components should be made.

Maintenance: Like any steel bridge, this one will have its life extended by reduction of road salt, periodic washing, and a regular paint cycle. The concrete portions also need to be control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of spalling and scour should seek to duplicate the form, color, and surface texture of existing concrete. Penetrating, semi-permeable sealers can assist in reducing weathering. However, most concrete damage is due to moisture from the roadway, not weather. In addition to erosion effects, water penetration results in freeze-thaw damage and corrosion-expansion of reinforcing road. Impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: Selective replacement of members with like material will have little impact on the bridge's integrity. Similarly, the pinions and drive gears can be replaced in kind, provided the original materials and dimensions are respected. The choice of deck material is not of great historical importance.

Rehabilitation of historic concrete elements should attempt to reproduce the form, color, and surface texture of the original as closely as possible.

Widening: Not practical, except through the construction of a parallel bridge to carry one direction of traffic.

Bypass: In a sense this bridge has already been bypassed by Route 95. Total bypass of this bridge is probably not consistent with the need to minimize navigational obstructions.

BRIDGE NO. 1843
(STEVENSON DAM BRIDGE)

Route 34 (Roosevelt Drive) over Housatonic River, Monroe - Oxford

Description: 24-span bridge of concrete arches built atop the spillway to the Stevenson Dam, 1919. Modern concrete parapet with metal guardrail attached. Two replaced steel-beam spans at north end.

Similar Structures in Preservation Plan: None.

Historical Significance: An integral part of an historic hydroelectric project.

Preservation Planning:

General Considerations: The preservation of this bridge depends upon what happens to the dam of which it is a part; it is unlikely that any serious modification to one component could be undertaken without completely changing the other. Widening and bypass would not appear to be meaningful in this context.

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of spalling and scour should seek to duplicate the form, color, and surface texture of existing concrete. Penetrating, semi-permeable sealers can assist in reducing weathering. However, most concrete damage is due to moisture from the roadway, not weather. In addition to erosion effects, water penetration results in freeze-thaw damage and corrosion-expansion of reinforcing road. Impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: Substantial rebuilding of these concrete arches following the original form would not seriously affect the integrity of the resource taken as a whole. However, total replacement of the bridge without attention to reproducing its distinctive multiple-arched form would degrade the appearance of the complex.

BRIDGE NO. 1860

(SAMSON OCCUM BRIDGE)

Route 433 (Massapeag Side Road) over Shantok Brook, Montville.

Description: 1936 arch of fieldstone set in thick concrete mortar.

Similar Structures in Preservation Plan: 5217, 5218, 1603, 1604, 1605

Historical Significance: The bridge is an example of the park bridges of the 1920s and 1930s, typified by their rustic stone masonry. The bridge has added significance as a W.P.A. project.

Preservation Planning:

General Considerations: The road carried by this bridge is now a through road bisecting Fort Shantok State Park. Nevertheless, it appears to be a relatively low-volume route, so it is unlikely that traffic needs will require the replacement or modification of this bridge in the near future. The bridge's preservation is therefore a matter of maintenance common to all masonry bridges: control of moisture and prompt repair of eroded surfaces. These problems were successfully addressed in the rehabilitation of the essentially similar park bridges at Devils Hopyard State Park.

Structural Rehabilitation: Stone arches rarely require structural upgrading, which by definition means taking down and re-erecting the entire bridge. Before such a drastic step is taken, supporting the roadway on a concrete slab imbedded above the stone arch should be investigated. The only effect of this technique would be to raise slightly the level of the roadway relative to the parapets.

Bypass: There would seem to be adequate room on either side of this bridge to re-align the road and by-pass the bridge.

Widening: The rustic quality of this bridge is not compatible with a roadway wider than two lanes. However, if some additional width were needed, widening in concrete, with re-erection of a spandrel and parapet in similar stonework, would not compromise the significance of the bridge, which primarily derives from the appearance of its stonework.

BRIDGE NO. 4214

(WHITTEMORE MEMORIAL BRIDGE)

Maple Street over Naugatuck River, Naugatuck

Description: Three-span concrete-arch with granite facing, 1912. Stone end piers, niche, and commemorative tablet. The present railing is not historic: it dates from repairs to the bridge completed in 1960.

Similar Structures in Preservation Plan: Other early "City Beautiful" concrete bridges include Bridges Nos. 4496, 977, and 3808.

Historical Significance: As well as being a relatively early example of concrete-arch construction, this bridge is significant for its decorative qualities, particularly the stone facing, end piers, and commemorative plaque. It was designed by the Architect of the Lincoln Memorial, Henry Bacon.

Preservation Planning:

Structural Rehabilitation: Because much of the significance of this bridge derives from its vidual qualities, substantial reconstruction of the arches can occur without violating its historic integrity, provided the stonework of the spandrels and end piers are maintained intact.

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of exterior damage should seek to duplicate the existing stonework as closely as possible, and replacement mortar should match the historic mortar in color, composition (especially the lime-cement ratio), and joint profile. Sealers on historic stonework are not recommended: impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Widening: Widening this bridge would alter its historic proportions and require reconstruction of the stone spandrel on the widened side. This should be considered only after other solutions are ruled out.

Bypass: Total by-pass at this location would probably complicate the existing street pattern too much. Provision of another river crossing nearby, however, would relieve some of the traffic carried by this bridge.

BRIDGE NO. 5217

Stanley Quarter Park Road over spillway, New Britain

Description: 1925, stone-faced concrete arch; ornamental parapet and end posts; memorial tablet.

Similar Structures in Preservation Plan: 5218, 1860, 1603, 1604, 1605

Historical Significance: The bridge is an integral part of the landscape of Stanley Quarter Park. It serves as one of the park's main entrances and was named in honor of a park commissioner's mother.

Preservation Planning:

General Considerations: Since it now serves to carry a one-way, low-speed park drive, it is unlikely that this bridge will require major work in the near future, nor will it likely be called upon to serve any greater role than at present. Therefore, its preservation is primarily a matter of adequate maintenance common to all concrete bridges: control of moisture, limited use of salt, and prompt repair of eroded surfaces. Although considered a public highway, the road is basically a park drive.

Masonry Repair: Work on the stonework of the spandrels, parapets, and end piers should follow the usual standards for repairing historic masonry. Cleaning should be with mild chemicals and low-pressure water spray. Repointing should be done with mortar compatible to the existing in color, composition (especially the lime-portland cement ratio, which is likely to be higher-lime than modern mortar), and joint profile. Replacement of stone should be limited to the absolute minimum necessary, using similar stone for any new work.

Structural Rehabilitation: Since the significance of this bridge comes primarily from the decorative effect of its stonework, work done to the structural arch itself will have little impact on the historic bridge, including totally rebuilding the arch, providing the spandrels are kept intact during the project.

Widening: Since the aesthetic character of the bridge is its chief claim to significance, drastic widening would strike at the essence of the bridge. Although it is possible to widen the bridge and re-erect the downstream stonework, it seems unlikely that the expense would be worth gaining a few feet of roadway. If widened, only one side of the bridge should be altered, and the spandrels, parapet, and end piers should be re-erected.

BRIDGE NO. 5218

Stanley Park Road "C" over spillway, New Britain

Description: 1936, stone-faced 2-span concrete arch; ornamental parapet and end posts.

Similar Structures in Preservation Plan: 5217, 1860, 1603, 1604, 1605

Historical Significance: The bridge is an integral part of the landscape of Stanley Park. It relates visually to the adjacent facilities building and two other bridges nearby.

Preservation Planning:

General Considerations: Since it now serves to carry a low-speed park drive, it is unlikely that this bridge will require major work in the near future, nor will it likely be called upon to serve any greater role than at present. Therefore, its preservation is primarily a matter of adequate maintenance common to all concrete bridges: control of moisture, limited use of salt, and prompt repair of eroded surfaces. Although considered a public highway, the road is basically a park drive.

Masonry Repair: Work on the stonework of the spandrels, parapets, and end piers should follow the usual standards for repairing historic masonry. Cleaning should be with mild chemicals and low-pressure water spray. Repointing should be done with mortar compatible to the existing in color, composition (especially the lime-portland cement ratio, which is likely to be higher-lime than modern mortar), and joint profile. Replacement of stone should be limited to the absolute minimum necessary, using similar stone for any new work.

Structural Rehabilitation: Since the significance of this bridge comes primarily from the decorative effect of its stonework, work done to the structure itself will have little impact on the historic bridge, including totally rebuilding the arches, providing the spandrels are kept intact during the project. This may prove difficult, since the stonework on this bridge is a flat veneer rather than self-supporting spandrels. If the spandrels cannot be saved during reconstruction, they should be duplicated using the existing stone.

Widening: Since the aesthetic character of the bridge is its chief claim to significance, drastic widening would strike at the essence of the bridge. Although it is possible to widen the bridge and re-set the stonework, it seems unlikely that the expense would be worth gaining a few feet of roadway. If widened, only one side of the bridge should be altered, and the spandrels, parapet, and end piers should be re-erected.

BRIDGE NO. 1561

Route 219 over East branch Farmington River, New Hartford

Description: 1930, steel Pratt through truss, 1 span; fabricated by Berlin Construction Co.

Similar Structures in Preservation Plan:

Trusses, 1921 and Later: 1496, 3788, 562, 1649, 1524, 1487, 4434, 507, 1415, 349

Pratt Trusses, 1921 and Later: 1415, 349

Berlin Construction Co. Trusses, 1921 and Later: 1524, 4434.

Historical Significance: Typifies truss-bridge construction during the automotive age. Built under the state Highway Department's trunk-line bridge program. Berlin Construction was the state's only significant bridge fabricator in the 20th century.

Preservation Planning:

General Considerations: New deck and railings, installed during rehabilitation in 1987-1988, do not substantially compromise the historic integrity. Because the bridge was repaired rather than replaced, it is assumed that the present structure is functionally adequate.

Structural Rehabilitation: Selective patching and in-kind replacement of members would not compromise the structure's historic integrity.

BRIDGE NO. 4434

Black Bridge Road over West Branch Farmington River, New Hartford

Description: 1936, steel Warren pony truss, 2 spans; fabricated by Berlin Construction Co.

Similar Structures in Preservation Plan:

Trusses, 1921 and Later: 1496, 3788, 562, 1649, 1524, 1487, 1561, 507, 1415, 349

Warren Trusses, 1921 and Later: 562, 1487, 1524

Berlin Construction Co. Trusses, 1921 and Later: 1524, 1561

Historical Significance: Typifies truss bridge construction of the automotive age; built by the town after the flood of 1936 destroyed the prior bridge, and paid for by the U.S. Works Progress Administration. Berlin Construction was the state's only significant bridge fabricator in the 20th century.

Preservation Planning:

General Considerations: The bridge is closed to vehicular traffic. Alternative crossings are available approximately three-quarter mile upstream and two miles downstream. Roadway width is 17'.

Structural Rehabilitation: Selective patching and in-kind replacement of members would not compromise the structure's historic integrity.

Bypass: Lack of adjacent buildings makes total bypass or lane division possible. Total bypass should be accompanied by some provision for maintenance of the historic bridge.

Widening/Secondary Structure: If a new structural system were inserted below the deck, the historic trusses can remain in place at the sides; the outer portion (one to two feet) of the floor beams, including the floor joints, should be retained both to preserve the historic fabric and to hide the new material.

Relocation: The spans are each 84' long, allowing relocation to park or trail use. The local historical context would be lost, but the intrinsic significance of the bridge, both as a typical structure of its time and the work of Berlin Construction, would outweigh that consideration.

BRIDGE NO. 3752

Olive Street over Amtrak, New Haven

Description: 1907, steel double-intersection Warren truss, 1 span; built by Berlin Construction Co.; recent floor system, altered web members. Very sharp end skew, resulting in asymmetrical webs.

Similar Structures in Preservation Plan: 3781, 3998

Historical Significance: Part of the New Haven Railroad's system-wide upgrade in the early 20th century; one of three essentially similar structures built by the railroad in this period, two of which were fabricated by Boston Bridge Works. This bridge was part of the program to improve the major rail corridor immediately north of New Haven Union Station, known as the New Haven Cut. In engineering history, it is significant as example of the heavy truss construction favored by railroads.

Preservation Planning:

General Considerations: This crossing is currently (February 1991) being considered for improvement. The critical problem, apparently, is the difficult set of alignments between the bridge and the surrounding streets and intersections.

Structural Rehabilitation: Limited, selective patching and in-kind replacement of members would not compromise the historic integrity. However, extensive use of these techniques, added to the recent repairs to floor system and web members, would likely cause a loss of historic integrity.

Bypass: Street pattern and the densely built-up setting eliminate this option.

Relocation: Not a meaningful option due to the size of the bridge and the historic significance of its location. Moreover, the highly site-specific character of the truss would be incomprehensible at another location.

BRIDGE NO. 3806

Chapel Street over West River, New Haven

Description: 1882 wrought-iron Pratt pony truss, 1 span, pin-connected; built by Berlin Iron Bridge Co.; original lattice railing and cast-iron newels.

Similar Structures in Preservation Plan: none

Historical Significance: Second oldest extant Berlin Iron Bridge Co. structure in the state; illustrates the range of the firm's work beyond the lenticular trusses. Includes the only open-web floor beams on a truss in the state.

Preservation Planning:

General Considerations: West Rock Park extends upstream and downstream of the bridge on both sides of the river. Alternative crossings are available nearby. The sidewalk, which was added after initial construction, is closed, apparently due to structural inadequacy; the bridge is open to vehicular traffic.

No Action: The extremely high significance of the bridge, the park use of the surrounding area, and the availability of nearby alternative crossings (Edgewood Avenue to the north, Derby Avenue to the south) suggest that closing the bridge to vehicles may be a viable option. Removing the added sidewalk would remove some load from the truss. Continuing maintenance would be necessary should the bridge remain in pedestrian use.

Structural Rehabilitation: Replacement of selected members with like components in steel would substantially preserve the historic appearance of the bridge. However, the small sections of the built-up members might be such that replacement in kind with steel would still not provide the desired capacity. Also, the retention of the open-web floor beams is a preservation priority but it would probably accord poorly with current standards.

Bypass: Nearby bypass to the upstream side would appear to be feasible; to the south is a deep gorge. Approach alignment is relatively straight at present; bypass might effect this negatively. If bypass is considered, some provision should be made for continuing maintenance of the historic structure.

Relocation: At 98' span length, this bridge is a possible candidate for relocation. Its high intrinsic significance would thus be preserved.

BRIDGE NO. 3808

Edgewood Avenue over West River, New Haven

Description: Three-span concrete ribbed arch; paneled spandrels, piers with acorn finial, urn-baluster railings.

Similar Structures in Preservation Plan: Other early "City Beautiful" concrete bridges include Bridges Nos. 4214, 977, and 4496.

Historical Significance: This bridge is an early example of the "City Beautiful" concrete arches of the early 20th-century. Unlike most others in the state, it relies on Neo-Classical concrete details rather than stone facing to achieve its monumental appearance. It is an integral part of a landscape that includes the adjacent parks and Edgewood Avenue, which takes the form of a boulevard just east of the bridge. Technologically, it is interesting because it uses ribs rather than a solid arch barrel.

Preservation Planning:

General Considerations: This bridge includes not only the structure itself but also the railings along the park roads which pass beneath it: any work on the bridge must respect the park roads as part of the historic resource. Since the decorative features are such an important part of the bridge, special attention needs to be given to any work which seeks to repair deteriorated surfaces or elements. Exact reproduction of balusters and close matching of any patching is especially important in this bridge.

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of spalling and scour should seek to duplicate the form, color, and surface texture of existing concrete. Penetrating, semi-permeable sealers can assist in reducing weathering. However, most concrete damage is due to moisture from the roadway, not weather. In addition to erosion effects, water penetration results in freeze-thaw damage and corrosion-expansion of reinforcing road. Impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: Because much of this bridge's significance lies in its decorative effects, considerable structural upgrading could be done provided the paneled spandrels, balustrade, and piers could be protected.

Widening: Given the width of the roadway (42'), it is unlikely that widening will be necessary if Edgewood Avenue remains a two-lane road. Rather than affecting this bridge and the park roads below, it would be better to achieve any increase in capacity by building a parallel span north of the structure; lane division already exists just east of the bridge.

Guardrail: If roadway protection needs to be enhanced, the effect on the existing railings should be minimized. Installation of guardrail at the edge of the roadway, separating the road from the verge and sidewalk, would have minimal effect.

Bypass: Total by-pass of the structure is possible to the north, though its effect on existing street alignment might make it undesirable.

BRIDGE NO. 3873

Court Street over railroad, New Haven

Description: 1907 multi-span, plainly detailed concrete arch

Similar Structures in Preservation Plan: The 1910 Terryville Tunnel (Bridge No. 4139) is similar in date and historic context.

Historical Significance: Built as part of the "New Haven Cut," a component of the New Haven Railroad's early 20th-century improvement program. The only remaining example of at least five similar concrete-arch structures. The bridge is among the earliest concrete arches in the state.

Preservation Planning:

General Considerations: The extent of concrete deterioration required the demolition of other bridges of this type, and it appears that the condition of this bridge is such that it cannot be rehabilitated. Current planning is exploring the use of the bridge as a pedestrian crossing. Any repair of spalling or erosion should attempt to match existing profiles and surfaces as closely as possible.

The bridge was designed as a self-supporting steel arch, to which were added additional reinforcing rod and concrete. At the time it was built, it was considered exceptionally strong.

Structural Rehabilitation: Concrete bridges can undergo substantial structural rehabilitation, provided the final surface matches the original in form and texture. This bridge is so plain that this should pose few problems. Since part of its significance is technological, detailed photographs should be taken during any removal/rehabilitation of historic concrete.

Widening: Widening this bridge (to one side only) would not affect its historical value. Since there is no parapet or original railing on any of them, the widening would have little visual effect from the roadway.

Bypass: The congested setting of this bridge makes questionable the viability of the by-pass option.

BRIDGE NO. 3879

Clifton Street over Metro North Railroad, New Haven

Description: c.1885, substantial arch made of rusticated stones.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 2241, 4700, 4704, 3793, 4839, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Well-preserved example of substantial masonry bridge construction of the 19th century. Important association with physical development of the New Haven Railroad system.

Preservation Planning:

General Considerations: Width of 26' is close to the recommended minimum. Roadway is near the north end of the barrel, which is about 130'long; thus slightly widening the roadway to the south would not require modification to the structure itself. In all, a good candidate for long-term survival based on apparently good condition and flexibility provided by extended barrel length.

BRIDGE NO. 3998

Ferry Street over Amtrak, New Haven

Description: 1912, steel double-intersection Warren truss, 1 span; built by Boston Bridge Works.

Similar Structures in Preservation Plan: 3752, 3781

Historical Significance: Part of the New Haven Railroad's system-wide upgrade in the early 20th century; one of three essentially similar structures built by the railroad in this period, two of which were fabricated by Boston Bridge Works. This bridge was part of the program to improve the major rail corridor between New Haven Union Station and Cedar Hill Railyard. In engineering history, it is significant as example of the heavy truss construction favored by railroads.

Preservation Planning:

General Considerations: Improvements that would upgrade load-bearing capacity are currently planned for this crossing.

Structural Rehabilitation: Selective in-kind replacement of structural members or replacement of the deck material would not compromise the historic integrity of the bridge.

Bypass: Street pattern and the densely built-up setting eliminate this option.

Relocation: Not a meaningful option due to the size of the bridge and the historic significance of its location.

BRIDGE NO. 4138

Wintergreen Avenue over Town Farm Brook, New Haven

Description: 1890, substantial keystone arch built of rusticated blocks.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 2241, 4700, 4704, 3793, 4839, 3879, 4130, 4754, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Well-preserved example of substantial masonry bridge construction of the late 19th century; associated with the expansion of New Haven's development to the northwest.

Preservation Planning:

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring and spandrel of the north side are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Recent repointing used apparently high-cement mortar that will cause deterioration of the joints and the stones; future pointing should use high-lime mortar.

Widening: Widening to one side could cause the loss, or at least the loss of visibility, of one spandrel and parapet, and may well constitute an adverse effect. Leaving one side fully intact may, however, constitute acceptable mitigation.

Bypass: Nearby intersections on both sides would complicate, and perhaps prohibit, this option.

BRIDGE NO. 507

Glen Road (Route 816) over Housatonic River, Sandy Hook, Newtown

Description: 1934, steel Parker through truss, 1 span.

Similar Structures in Preservation Plan:

Trusses, 1921 and Later: 1496, 3788, 562, 1649, 1524, 1487, 1561, 4434, 1415, 349

Parker Through Trusses, 1921 and Later: 1496, 3788, 1649, 349

Historical Significance: Largest single-span truss bridge in the preservation plan; built by the state Highway Department under its trunk-line bridge program.

Preservation Planning:

General Considerations: Rehabilitation in 1985 installed new deck and floor system, added large gusset plates to floor joints, and selectively replaced in-kind deteriorated members. This project did not substantially compromise the historic integrity.

Structural Rehabilitation: Further selective patching and in-kind replacement of truss members will not detract from the historic integrity.

BRIDGE NO. 4130

Perry Avenue over Silvermine River, Norwalk

Description: 1899, masonry arch with cut ring stones, rubble spandrels, and curbing of rusticated blocks; modern pipe rail.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 2241, 4700, 4704, 3793, 4839, 3879, 4138, 4754, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Relatively well-preserved example of the typical vernacular masonry-bridge technology of the late 19th century.

Preservation Planning:

General Considerations: Riverbank retaining walls that are integral with west abutment, intersection immediately east of the bridge, and nearby buildings combine rule out substantial widening or bypass.

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring and spandrel of the north side are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

BRIDGE NO. 4155

Glover Avenue over Norwalk River, Norwalk

Description: 1912, 2-span ashlar-masory arch with polychrome effect achieved by use of granite and brownstone of contrasting colors.

Similar Structures in Preservation Plan: Other ornamental masonry arches built in the 20th century include #4779 and #4746.

Historical Significance: Well-preserved example of the decorative urban bridges erected during the City Beautiful movement of the early 20th century. Associated with the spread of dense settlement and the rise of municipal services in Norwalk.

Preservation Planning:

General Considerations: Once a principal access to the region west of old Route 7, this bridge is now limited substantially in its use to serve as parking-lot access for the employees of the office building immediately north of Glover Avenue. Construction of the new Route 15/Route 7 interchange has caused the permanent blockage of access to that region from this direction. Since the polychrome masonry is such an important part of the bridge, special attention needs to be given to any work that seeks to repair deteriorated surfaces or elements. Exact reproduction of form and close matching of stone and mortar is particularly important.

Structural Rehabilitation: Structural upgrade would not constitute an adverse effect as long as the visible surfaces are not impacted. Embedding a concrete structure in the arch would not compromise historic integrity, so long as all the ornamental surfaces and features are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

Widening/Bypass: Building density and proximity to Route 15 preclude these options.

SOUTH NORWALK RAILROAD BRIDGE

Metro North over South Main Street, Norwalk

Description: Four-track pin-connected railroad Pratt through-truss, 1896.

Similar Structures in Preservation Plan: None.

Historical Significance: Significant as a large example of 19th-century railroad bridge engineering and as the product of Berlin Iron Bridge Company, Connecticut's leading bridge fabricator. It also has historical significance as part of the New Haven Railroad's late 19th-century expansion program and as part of the development of the South Norwalk commercial area, in which local citizens campaigned for elimination of the grade crossing at this point.

Preservation Planning:

General Considerations: The needs of the railroad will probably affect this bridge more than highway considerations. Continued maintenance of the structure, including a regular paint cycle, will extend its life.

Structural Rehabilitation: Extensive replacement-in-kind of deteriorated structural members will not affect the integrity of this bridge as a historic resource. Beyond the substitution of modern steel for corroded members, it will be difficult to increase the load-carrying capacity of the bridge, given the already low clearance between South Main Street and the floor beams. It may not be necessary to do so, since modern locomotives present lighter loads than did the steam locomotives of years past.

Widening: Widening South Main Street seems neither necessary nor feasible with substantial redevelopment of the entire area.

BRIDGE NO. 4746

Sunnyside Street over Yantic River, Yantic, Norwich

Description: 1908, ashlar-masonry arch with ornamental turrets, corbels and battlements.

Similar Structures in Preservation Plan: Other ornamental masonry arches built in the 20th century include #4779 and #4115.

Historical Significance: Outstanding architectural qualities presenting a fully realized Tudor Revival design; associated with the cohesive and well-preserved industrial village of Yantic.

Preservation Planning:

General Considerations: Since the decorative elements are such an important part of the bridge, special attention needs to be given to any work that seeks to repair deteriorated surfaces or elements. Exact reproduction of form and close matching of stone and mortar is particularly important. If the decorative elements of the bridge are preserved, visual impact on the potential historic district will be minimal as well.

Structural Rehabilitation: Structural upgrade would not constitute an adverse effect as long as the visible surfaces are not impacted. Embedding a concrete structure in the arch would not compromise historic integrity, so long as all the ornamental surfaces and features are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

Bypass: Close-by bypass would have be examined in terms of its effect on the potential historic district. Remote bypass -- a different location of crossing for through traffic -- appears to be feasible.

Widening. Widening (roadway currently is 14') would probably constitute an adverse effect, but making the new structure as unobtrusive as possible and replacing all the stonework may be accepted as mitigation.

BRIDGE NO. 1415

Route 169 over Shetucket River, Norwich-Lisbon

Description: 1938, steel Pratt deck truss, 2 spans.

Similar Structures in Preservation Plan:

Trusses, 1921 and Later: 1496, 3788, 562, 1649, 1524, 1487, 1561, 4434, 507, 349

Pratt Trusses, 1921 and Later: 1561, 349

Deck Trusses, 1921 and Later: 562

Historical Significance: Demonstrates evolution of truss construction in the automobile age, with extensive use of rolled beams where built-up girders had been used earlier, and slab deck with no stringers. Built by the state Highway Department as part of the massive recovery program (more than 50 bridges) after the Hurricane of 1938.

Preservation Planning:

Structural Rehabilitation: Selective and in-kind replacement of members or replacement of the deck material would not compromise the structure's historic integrity.

BRIDGE NO. 948

Route 34 (Derby Avenue) over Wepawaug River, Orange

Description: Concrete arch with stone spandrels, parapet, and wing walls, built in two stages, c.1925 and 1942. Rough-faced random-ashlar stone. Modern guardrail.

Similar Structures in Preservation Plan: other similarly detailed concrete arches from this period include Bridges Nos. 1537, 1591, 4992, 3645, 963, 992, 4166, 5041, and 1117.

Historical Significance: An exceptionally detailed stone-faced arch, with historical significance as part of the reconstruction of Derby Avenue into New Haven's principal link with the Wilbur Cross parkway.

Preservation Planning:

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of exterior damage should seek to duplicate the existing stonework as closely as possible, and replacement mortar should match the historic mortar in color, composition (especially the lime-cement ratio), and joint tooling. Sealers on historic stonework are not recommended: impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: This bridge primarily has interest because of its stonework. Massive structural replacement of the arch would diminish its integrity, but much of the bridge's significance would remain if the ringstones, spandrels, parapets, and alcoves were kept intact.

Widening: Already widened once, the bridge could be given additional widening with an accurate rebuilding of the stone arch ring, spandrel, wing walls and parapet on the widened side.

BRIDGE NO. 4402

Brunswick Avenue over Moosup River, Almyville, Plainfield

Description: 1886, wrought-iron lenticular through truss, 1-span, pin-connected.

Similar Structures in Preservation Plan: 4403

Historical Significance: One of five remaining Berlin Iron Bridge Co. through trusses in the state (four are lenticulars) and, along with nearby #4403, one of the two oldest lenticular through trusses under ConnDOT jurisdiction. Features the end-panel stiffening struts covered under the William Douglas patent of 1885. Strong contextual significance based on its location in a mill village and its origin in the rebuilding effort that followed the flood of 1885.

Preservation Planning:

General Considerations: Though closed to all traffic the bridge apparently remains under ConnDOT jurisdiction based on its listing in the state Bridge Log. It is effectively bypassed by the nearby bridge carrying Route 14 over the Moosup River.

Structural Rehabilitation: If consideration is ever given to placing this crossing back into vehicular service, selective patching and replacement of wrought-iron truss components with like members in steel would not detract seriously from the bridge's historic integrity.

Secondary Structural System: If consideration is ever given to placing this crossing back into vehicular service, a beam structure below the deck would preserve much of the bridge's historic integrity. If this option is pursued, a portion (one or two feet) of the outer ends of the floor beams should be left in place, including the original hairpin floor joints; this would retain the distinctive technology embodied in these joints, and help to hide the new material.

Widening: This is not a meaningful option for a through truss. The width of 24' is substandard but perhaps acceptable under 23 CFR 625.

Relocation: With careful disassembly this bridge could be taken down and reassembled at a park or trail location, although through trusses are clearly more difficult to disassemble than pony trusses. Moreover, the 120' span length is likely much larger than required at most trail or park crossings.

BRIDGE NO. 4403

River Street #1 over Moosup River, Moosup, Plainfield

Description: 1886, wrought-iron lenticular through truss, 1-span, pin-connected.

Similar Structures in Preservation Plan: 4402

Historical Significance: One of five remaining Berlin Iron Bridge Co. through trusses in the state (four are lenticulars) and, along with nearby #4402, one of the two oldest lenticular through trusses under ConnDOT jurisdiction. Features the end-panel stiffening struts covered under the William Douglas patent of 1885. Strong contextual significance based on its location in a mill village and its origin in the rebuilding effort that followed the flood of 1885.

Preservation Planning:

General Considerations: Nearby crossings within the village of Moosup are available both upstream and downstream.

Structural Rehabilitation: Selective patching and replacement of wrought-iron truss components with like members in steel could increase load capacity and would not detract seriously from the bridge's historic integrity.

Secondary Structural System: If consideration is ever given to placing this crossing back into vehicular service, a beam structure below the deck would preserve much of the bridge's historic integrity. If this option is pursued, a portion (one or two feet) of the outer ends of the floor beams should be left in place, including the original hairpin floor joints; this would retain the distinctive technology embodied in these joints, and help to hide the new material.

Widening: This is not a meaningful option for a through truss. The width of 24' is substandard but perhaps acceptable under 23 CFR 625.

Relocation: With careful disassembly this bridge could be taken down and reassembled at a park or trail location, although through trusses are clearly more difficult to disassemble than pony trusses. Moreover, the 120' span length is likely much larger than required at most trail or park crossings.

BRIDGE NO. 4754

Packerville Road over Mill Brook, Packerville, Plainfield

Description: c.1850, masonry arch with cut-stone barrel and rubble spandrels; pre-cast concrete roadway barriers.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 2241, 4700, 4704, 3793, 4839, 3879, 4138, 4130, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Relatively well-preserved example of 19th-century vernacular masonry bridge technology. Concrete barriers detract from historical appearance, but represent a reversible treatment. Associated with nearby small-scale processing enterprises of the mid-19th century.

Preservation Planning:

General Considerations: Intersection immediately southeast of the bridge would complicate any plans for widening or bypass.

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring and spandrel of the north side are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

Widening: Widening to one side could cause the loss, or at least the loss of visibility, of one spandrel and parapet, and may well constitute an adverse effect. Leaving one side fully intact may, however, constitute acceptable mitigation.

BRIDGE NO. 4139

Tunnel Road, Allen Street, and South Main Street over Boston & Maine railroad, Plymouth

Description: 1910 railroad tunnel, 3,580' in length, with concrete-arch portals under Tunnel Road and South Main Street defining the east and west ends of the structure.

Similar Structures in Preservation Plan: Unique, although the Court Street concrete arch over the New Haven Cut (Bridge Nos. 3873) is of similar age and shares some of the same historic context.

Historical Significance: The tunnel is significant as a major work of railroad engineering and a relatively early use of reinforced concrete.

Preservation Planning:

General Considerations: The significant resource is the railroad tunnel itself, not the highway bridges per se. The key features which could be impacted by highway bridge work are the two concrete portals. These are the most visible components of the tunnel, and they also serve to indicate its date of origin. Any work on Tunnel Road or South Main Street should attempt to maintain or reproduce the concrete portals. Any repair of spalling on the portals should attempt to match existing concrete in form, color, and texture.

Structural Rehabilitation: Reconstruction of the tunnel under the roads in order to provide greater load-bearing capacity or to correct deterioration would not substantially affect the historic integrity of the resource, provided the portals are maintained.

Widening. Since the two roads which cross the portals by definition have only one side with historically significant material, either road could be widened indefinitely on the other side while leaving the historic portal in place.

MIDDLE HADDAM ROAD BRIDGE

(no ConnDOT number)

Middle Haddam Road over Air Line Railroad (abandoned), Portland

Description: c.1890, ashlar-masonry arch bridge.

Similar Structures in Preservation Plan: There are seven other 19th-century masonry-arch bridges in the Plan that originally carried a railroad: 3682, 1617, 1079 and four other bridges that carry or cross public rights-of-way but do not have ConnDOT bridge numbers -- River Road in Colchester, Field Point Road and Arch Street in Greenwich, and Kinsman Road Extension in Lisbon.

Historical Significance: A well-preserved example of the heavy masonry construction, with finely finished stone throughout, employed in 19th-century railroad bridges; important historical association with the New Haven Railroad's consolidation of rail transportation in the state.

Preservation Planning:

General Considerations: Any future consideration on the part of ConnDOT for its replacement would likely derive from the roadway width (under 28') or realignment of the curving approaches. Any action addressing these matters would probably threaten the bridge. Town records indicate that Northeast Utilities owns the bridge, which stands adjacent to a major substation.

Structural Rehabilitation: Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

BRIDGE NO. 992

(PUTNAM MEMORIAL BRIDGE)

Route 44 over Quinebaug River, Putnam

Description: Large (70' span) 1925 arch, with raised arch ring, pilasters, and paneled spandrels. The parapet is enlarged at intervals to provide bases for concrete standards carrying brass lamps. Central tablets on the parapet bear bronzes commemorating Putnam's contribution to World War I.

Similar Structures in Preservation Plan: other similarly detailed concrete arches from this period include Bridges Nos. 1537, 1591, 4992, 3645, 948, 992, 4166, 5041, and 1117.

Historical Significance: One of the larger and most finely detailed of the State Highway Department's projects from the 1920s and 1930s, expressly designed to be an impressive part of Putnam's downtown as well as a major public war monument.

Preservation Planning:

General Considerations: Since the decorative concrete features are such an important part of the bridge, special attention needs to be given to any work which seeks to repair deteriorated surfaces or elements. Exact reproduction of form and close matching of any patching is especially important in this bridge. Eventually work will be needed to repair the effects of erosion already evident. Past episodes of patching, particularly on the parapet, have blended in fairly well with the old.

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of spalling and scour should seek to duplicate the form, color, and surface texture of existing concrete. Penetrating, semi-permeable sealers can assist in reducing weathering. However, most concrete damage is due to moisture from the roadway, not weather. In addition to erosion effects, water penetration results in freeze-thaw damage and corrosion-expansion of reinforcing road. Impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: Because much of this bridge's significance lies in its decorative effects, considerable structural upgrading could be done provided the paneled spandrels, arch ring, pilasters, parapet, lamps, and commemorative bronzes were retained.

Widening: Moderate widening of the bridge, to one side only, could be undertaken without destroying the bridge's integrity or scenic qualities provided the arch ring, pilasters, parapet, and lamps were all accurately reproduced on the widened side and the commemorative bronzes re-installed.

By-pass: Building density, existing street pattern, and Cargill Falls just upstream make by-pass or construction of a parallel bridge difficult at this location.

ARCH STREET BRIDGE

(no ConnDOT number)

Providence and Worcester Railroad over Arch Street, Putnam

Description: 1901, 1-span ashlar-masonry arch.

Similar Structures in Preservation Plan: There are four other simple, 20th-century masonry-arch bridges in this Plan: 900, 5011, 4149, and one other bridge that carries a public highway but does not have a ConnDOT bridge number -- Hartford Road in Manchester.

Historical Significance: A well-preserved example of the heavy masonry construction, with finely finished stone throughout, employed in 19th-century and early 20th-century railroad bridges. Associated with the consolidation and rationalization of Connecticut rail transportation by the New Haven Railroad; this bridge and another grade separation were built in Putnam at the same time as the downtown depot was given a new building.

Preservation Planning:

General Considerations: Any future consideration on the part of ConnDOT for its replacement would likely derive from the roadway width (16'). Any action addressing the width would probably threaten the bridge.

Structural Rehabilitation: Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

BATES AVENUE BRIDGE

(no DOT #)

Bates Avenue over Little Dam Tavern Brook, Putnam

Description: c.1840, rubble-masonry arch.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 2241, 4700, 4704, 3793, 4839, 3879, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue Bridge, Putnam

Historical Significance: Among the earliest surviving bridges in the state; well-preserved example of vernacular masonry construction. Associated with nearby 1840s industrial enterprises of Hosea Ballou.

Preservation Planning:

General Considerations: Merits priority for preservation as one of the oldest extant bridges in Connecticut.

Bypass: High intrinsic significance makes this the option of first preference over any other that would impact the historic fabric of the bridge. Bypass appears possible, especially to the west; if undertaken, the new bridge should be far enough away not to obscure the view of the old.

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring and spandrel of the north side are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

Widening: Not recommended for this bridge due to the loss or obscuring of historic fabric.

BRIDGE NO. 963

Route 41 over Sage Ravine Brook, Salisbury

Description: 1929 concrete arch, with raised arch ring and paneled spandrels decorated with large circular bosses. The recessed panels of the parapet have a rougher texture created by exposed aggregate. Modern guardrail.

Similar Structures in Preservation Plan: other similarly detailed concrete arches from this period include Bridges Nos. 1537, 1591, 4992, 3645, 948, 992, 4166, 5041, and 1117.

Historical Significance: One of the most finely detailed of the State Highway Department's projects from the 1920s and 1930s, probably designed to complement the scenic qualities of the location, Sage Ravine.

Preservation Planning:

General Considerations: Since the decorative concrete features are such an important part of the bridge, special attention needs to be given to any work which seeks to repair deteriorated surfaces or elements. Exact reproduction of paneled forms and bosses and close matching of any patching is especially important in this bridge.

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of spalling and scour should seek to duplicate the form, color, and surface texture of existing concrete. Penetrating, semi-permeable sealers can assist in reducing weathering. However, most concrete damage is due to moisture from the roadway, not weather. In addition to erosion effects, water penetration results in freeze-thaw damage and corrosion-expansion of reinforcing road. Impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: Because much of this bridge's significance lies in its decorative effects, considerable structural upgrading could be done provided the paneled spandrels, arch ring, and parapet were retained.

Widening: Widening the bridge, to one side only, would only preserve the bridge's scenic quality if the arch ring, spandrel, and parapet detail were reproduced on the widened side. Any new parallel span should respect the bridge's setting.

BRIDGE NO. 2305

Route 44 (Main Street) over Burton Brook, Salisbury

Description: 1873, short-span masonry arch of squared-up stone.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 2241, 4700, 4704, 3793, 4839, 3879, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue, Putnam

Historical Significance: Well-preserved example of vernacular 19th-century masonry bridge-building.

Preservation Planning:

General Considerations: Unusually wide (27') for a 19th-century bridge. Merits high preservation priority due to relatively early construction date and high degree of preservation.

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring and spandrel of the north side are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

BRIDGE NO. 5191

Sharon Station Road over Webatuck River, Sharon

Description: 1885, wrought-iron lenticular pony truss, 1 span; supported on steel beams inserted in 1956; original floor system removed at that time.

Similar Structures in Preservation Plan: 2212, 4500, 4534, 4575, 5038, 5065, 5159

Historical Significance: This bridge is significant as one of eight Berlin Iron Bridge Co. lenticular pony trusses in the Preservation Plan. It retains many characteristic details, such as nut-connected portal joints, relatively light built-up web members, and pinned panel joints. The bridge is closed to traffic, and effectively bypassed.

Preservation Planning:

Widening: The floor system is the historic fabric that is lost in widening a truss. Since the original floor system has already been removed from this bridge, this consideration is not necessary. At only 20' width, it is conceivable that widening to the standard minimum of 28' might be recommended for this crossing in the future. Up to that roadway width, the trusses should remain in place. On any wider a bridge, the trusses might take on a ludicrous appearance, as vestigial ornamentation on a thoroughly modern structure.

Guardrails: The trusses now serve in effect as guardrails. New roadway barriers would compromise the appearance of the old trusses, but would also help to protect them from collision. Any new roadway barrier should leave the trusses in place, and preferably would not be attached to them.

Structural Rehabilitation: Since the trusses do not carry load, this is not a concern. Replacing the existing secondary structural system of steel beams presents no preservation problems, as long as the above-noted concerns about widening and guardrails are taken into account.

Relocation: The small size of the bridge makes it a good candidate for relocation as a pedestrian or park bridge. Also, the significance of this truss is based more on its intrinsic technology than on its location. The location, however, is not completely without preservation significance, because among surviving lenticulars this span at present defines the northwestern limit of incidence for the type.

Bypass: This does not appear to be a meaningful option for preservation because a critical element of the historic structure -- the floor system -- has already been removed.

BRIDGE NO. 1659
(DERBY-SHELTON BRIDGE)

Bridge Street over Housatonic River, Shelton - Derby

Description: Five-span concrete arch bridge, with raised pilasters, arch rings, paneled parapet; 1918.

Similar Structures in Preservation Plan: None are completely comparable in form, period, size, and historical context.

Historical Significance: Significant as an early and substantial state highway project, among the largest filled-spandrel spans (94') in the state.

Preservation Planning:

General Considerations: The decorative concrete features of this bridge, such as the arch ring, pilasters, and parapet, give it its character and identify its period of origin. Any work on the bridge should seek to duplicate the historical concrete with material which matches it in form, color, and surface texture, particularly the exposed aggregate of the parapet panels.

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of spalling and scour should seek to duplicate the form, color, and surface texture of existing concrete. Penetrating, semi-permeable sealers can assist in reducing weathering. However, most concrete damage is due to moisture from the roadway, not weather. In addition to erosion effects, water penetration results in freeze-thaw damage and corrosion-expansion of reinforcing road. Impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: Concrete bridges such as this can be substantially rehabilitated without destroying their integrity provided that the raised arch ring, spandrel, and parapet detail is either preserved in place or accurately reproduced.

Widening: Constructing a parallel span on one side would be preferable to impacting the historic bridge itself. However, widening the bridge, on one side only, with reproduction of the arch ring, spandrel, pilaster, and parapet detail, would preserve much of the historic appearance of the bridge and would not greatly diminish its significance.

Guardrail: No roadway protection at present. If additional protection is deemed necessary, it would be best for preserving the historical parapet if guardrail were installed between the shoulders and sidewalks. This would also separate the roadway from the lamp bases.

Bypass: Given the existing building density and established street pattern, bypass is probably not practical.

BRIDGE NO. 4555

Maple Street over Scantic River, Somersville, Somers

Description: c.1880, 2-span masonry arch with cut ring stones and rubble spandrels; part of 19th-century textile-mill complex. Widened to east by means of concrete arches.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 2241, 4700, 4704, 3793, 4839, 3879, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue, Putnam

Historical Significance: Mostly significant for its contribution to the potential historic district comprised by the surrounding industrial community. Low intrinsic significance due to lack of integrity.

Preservation Planning:

General Considerations: Proximity to buildings and waterpower facilities would complicate any bypass or further widening. Most important consideration of any proposed work would be its impact on the district as a whole.

BRIDGE NO. 4779

CHRISTOPHER ALLEN BRIDGE

Spring Street over Middle River, Stafford Springs, Stafford

Description: 1912, ashlar masonry arch with Classical detailing and lamp columns, located at the entrance to Hyde Park.

Similar Structures in Preservation Plan: Other ornamental masonry arches built in the 20th century include #4155 and #4746.

Historical Significance: Well-preserved example of the ornate urban bridges erected during the City Beautiful movement of the early 20th century. Important associations with local manufacturers who funded and designed it, including the eponymous Allen.

Preservation Planning:

General Considerations: Since the decorative features -- benches, niches, lamp standards -- are such an important part of the bridge, special attention needs to be given to any work that seeks to repair deteriorated surfaces or elements. Exact reproduction of form and close matching of stone and mortar is particularly important. If the decorative elements of the bridge are preserved, visual impact on the park will be minimal as well. Although the width is narrow (21'), this is a low-speed roadway with only minimal use by through traffic.

Structural Rehabilitation: Structural upgrade would not constitute an adverse effect as long as the visible surfaces are not impacted. Embedding a concrete structure in the arch would not compromise historic integrity, so long as all the ornamental surfaces and features are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

Bypass: Nearby alternate routes are already available.

BRIDGE NO. 2212

Main Street over Rippowam River, Stamford

Description: 1888, wrought-iron lenticular pony truss, 2 spans.

Similar Structures in Preservation Plan: 4500, 4534, 4575, 5038, 5159, 5191, 5065

Historical Significance: This bridge is significant as one of eight Berlin Iron Bridge Co. lenticular pony trusses in the Preservation Plan and the only Berlin bridge that is a multi-span structure. It retains many characteristic details, such as portal joints, tapered floor beams, relatively light built-up web members, pinned panel joints, ornamental urns, and on the south sidewalk, an original lattice railing. Except for the replacement north railing and the added concrete piers, it stands virtually intact.

Preservation Planning:

General Considerations: The roadway load is now borne not by the trusses but by concrete piers added under each floor beam. Since the floor system continues to function as a load-bearing component, reduction of salt on the bridge and periodic washing of the underside will prolong the life of these metal members. Also, the accumulation of waterborne debris against the piers should be evaluated for possible destructive effects, especially in the case of sudden high water.

Structural Rehabilitation: The load-bearing capacity of the bridge is dependent upon the continued integrity of the concrete piers and the floor system, which appears to be largely original or at least replaced in kind. Additional replacement-in-kind of floor system members would not affect the historic qualities of the bridge, and substituting steel for wrought-iron parts could increase the load-bearing capacity.

Bypass: Building density on the east end and a complex intersection on the west end complicate any by-pass option for the bridge. Since the existing width seems adequate, and load-bearing problems can probably be addressed from below, bypass is not likely to be necessary. There is another crossing a short distance to the south.

Relocation: These trusses are good candidates for relocation because of their small size and high intrinsic significance. Both trusses should be relocated to the same location, if at all possible.

Secondary Structure: The present system of supporting the bridge on piers is good from an historic preservation point of view, but it may not be adequate in the future. Replacing the piers in kind would not affect the bridge. Inserting any new load-bearing system below the deck, such as I-beams, should be done in such a way that portions of the original floor beams and all lower joints are kept intact.

Guardrail: Additional roadway protection using metal guardrail attached to the trusses would not substantially affect either the integrity or the visual qualities of the bridge. It would, moreover, protect the bridge from impact damage.

BRIDGE NO. 3682

South State Street over Rippowam River, Stamford

Description: 1847, 3-span masonry-arch; stuccoed barrel, new railing.

Similar Structures in Preservation Plan: There are seven other 19th-century masonry-arch bridges in the Plan that originally carried a railroad: 1617, 1079 and five other bridges that carry or cross public rights-of-way but do not have ConnDOT bridge numbers -- River Road in Colchester, Field Point Road and Arch Street in Greenwich, Kinsman Road Extension in Lisbon, and Middle Haddam Road in Portland.

Historical Significance: Among the oldest bridge in this Plan, and the only known extant structure from the original construction of the New York and New Haven Railroad, which was later one of the major components in the consolidated firm known as the New York, New Haven and Hartford Railroad.

Preservation Planning:

General Considerations: Lack of apparent threats due to evidently ample width (27' roadway plus sidewalks) and load capacity, combined with important historical association and high scarcity value make this a priority candidate for preservation.

Structural Rehabilitation: Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

BRIDGE NO. 4182

White Rock Road over White Rock Canal and Pawcatuck River, Stonington, CT - Westerly, RI

Description: 1906, 2 spans of three parallel steel trusses; combined highway and streetcar original use.

Similar Structures in Preservation Plan: none.

Historical Significance: Significant as an artifact of electric-railroad construction: it was built as part of a Norwich to Westerly interurban line. Its historical significance is inherent in its location (Westerly merchants wanted the line to by-pass Pawcatuck). The bridge is also interesting because of its hybrid function and the combination of trusses. Its engineering significance is as an example of early 20th-century truss construction.

Preservation Planning:

General Considerations: Under dual jurisdiction of Connecticut and Rhode Island (RIDOT #065). Currently under 106/4(f) review in RIDOT. An evaluation of the apparently extensive physical deterioration will determine if there is any chance of saving the bridge in any capacity.

By-pass: The setting, including the impact on adjacent wetlands, should be studied to evaluate the possibility of a parallel bridge. Some structural upgrading (replacement of deteriorated members in kind) might allow the present bridge to continue to serve utility and pedestrian purposes. However, the extent of physical deterioration might mean even by-passing will not allow the bridge to survive.

Structural Rehabilitation/Secondary Structure: Replacing deteriorated members or adding a secondary structural system might allow increased load capacity so that the bridge can be used for one-way traffic; if so, it must be determined if lane division and a parallel span are feasible.

. Relocation. Because the location-dependent historical significance is at least as important as the bridge's intrinsic engineering significance, relocation of this truss would accomplish little in terms of preservation.

BRIDGE NO. 455

Route 159 over Stony Creek, Suffield.

Description: 1934, open-spandrel concrete arch with approach spans; railing of square balusters.

Similar Structures in Preservation Plan: 560, 603, 1132

Historical Significance: The bridge is a well-preserved example of open-spandrel concrete arch.

Preservation Planning:

General Considerations: The width and alignment of this bridge appear adequate to the needs of Route 159 for the foreseeable future. Its continued utility, therefore, primarily depends on avoidance of moisture penetration (run-off control, drains, roadway membrane) and reduced road salt. As this bridge lacks its original 1930s railings, one of the chief preservation issues is rendered moot.

Structural Rehabilitation: Most components of arches such as this can be continually renewed in kind. Care should be taken to duplicate the original as closely as possible, reproducing, for example, the exact taper of the support columns. In the case of this bridge, the lack of decorative detail makes concrete replacement more straightforward.

Widening: Almost by definition, widening an open-spandrel arch means constructing a parallel bridge; the only question is on which side and how far away. Building the parallel span as far away as feasible will preserve the visibility and setting of the existing arch, though the topography at this location will probably limit this option.

Bypass: It is likely that the existing bridge could serve increased traffic needs through the use of a parallel bridge to carry one direction of traffic. However, if that proves unfeasible, planning should seek a complete by-pass of the bridge.

BRIDGE NO. 603

(REYNOLDS BRIDGE)

Route 848 (Waterbury Road) over Naugatuck River, Thomaston.

Description: 1930, open-spandrel concrete arch with approach spans.

Similar Structures in Preservation Plan: 455, 560, 1132

Historical Significance: The bridge is an example of open-spandrel concrete arch.

Preservation Planning:

General Considerations: As this bridge has had its original 1930s railings modified on the roadway side, one of the chief preservation issues is rendered moot. As with all concrete arches, complete avoidance of moisture penetration (run-off control, drains, roadway membrane) and reduced road salt will prolong the life of the bridge.

Structural Rehabilitation: Most components of arches such as this can be continually renewed in kind. Care should be taken to duplicate all decorative aspects such as paneling on the piers, arches between piers, modillions, etc.

Widening: Almost by definition, widening an open-spandrel arch means constructing a parallel bridge; the only question is on which side and how far away. Building the parallel span as far away as feasible will preserve the visibility and setting of the existing arch.

Most other examples of this type of bridge long ago had their sidewalks taken for use as roadway shoulders. Since the sidewalks and railing no longer retain their original appearance from the roadway, the conversion of one or both sidewalks to road shoulders would not drastically affect the historic integrity of the bridge.

Bypass: It is likely that the existing bridge could serve increased traffic needs through the use of a parallel bridge to carry one direction of traffic. However, if that proves unfeasible, planning should seek a complete by-pass of the bridge.

BRIDGE NO. 1617

Hartford, Providence and Fishkill Railroad (abandoned) over Tunnel Road, Vernon

Description: 1847, ashlar-masonry tunnel under railroad embankment.

Similar Structures in Preservation Plan: There are seven other 19th-century masonry-arch bridges in the Plan that originally carried a railroad: 3682, 1079 and five other bridges that carry or cross public rights-of-way but do not have ConnDOT bridge numbers -- River Road in Colchester, Field Point Road and Arch Street in Greenwich, Kinsman Road Extension in Lisbon, and Middle Haddam Road in Portland.

Historical Significance: A well-preserved example of the heavy masonry construction, with finely finished stone throughout, employed in 19th-century railroad bridges; important historical association with the original construction of Connecticut's first inland east-west rail corridor. Among the oldest bridges in this Plan.

Preservation Planning:

General Considerations: Any future consideration on the part of ConnDOT for its replacement would likely derive from the vertical roadway clearance (12'-3"), roadway width (13'), or major reconfiguration of the present traffic system that features intersections on either side of the bridge and lack of end-to-end roadway visibility. Any action addressing these matters would probably threaten the bridge.

Structural Rehabilitation: Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

Bypass: Lack of heavy building density nearby, and the fact that the railroad was carried on a raised embankment, raise the potential feasibility of cutting an alternative passage through the embankment rather than impacting the historic bridge.

BRIDGE NO. 4575

Main Street over Tankerhoosen River, Talcottville section of Vernon

Description: 1891, wrought-iron lenticular pony truss, 1 span; original sidewalk railing and one orb finial remain.

Similar Structures in Preservation Plan: 2212, 4500, 4534, 5038, 5065, 5159, 5191

Historical Significance: This bridge is significant as one of eight Berlin Iron Bridge Co. lenticular pony trusses in the Preservation Plan. It retains many characteristic details, such as nut-connected portal joints, relatively light built-up web members, tapered floor beams and pinned panel joints. Unlike most survivors, it also retains some of its original decorative detail (railing and finial).

Preservation Planning:

Guardrails: The modern W-rail on the east side is relatively unobtrusive and also offers some protection to the historic truss. Placing a similar guardrail on the west side would not raise concern over the preservation of the bridge.

Bypass: A parallel modern structure appears to be feasible at this location. It should be visually unobtrusive, to preserve both the public view of the historic bridge and the overall appearance of the historic mill village. Besides correcting possible load-bearing deficiencies, bypass would also address the width and the approach alignment without affecting the historic bridge. Plans for bypass should include continuing maintenance for the historic structure.

Relocation: Like all the lenticular pony trusses, the small size of this bridge makes it a good candidate for relocation as a pedestrian or park bridge. Among the surviving examples, this one has a higher degree of contextual significance based on its location in a mill village.

Structural Rehabilitation/Secondary Structure: Replacing wrought iron members with similar parts in steel, or inserting a new structure beneath the deck could increase the load-bearing capacity, but would not address width or alignment.

Widening: Widening would eliminate the original floor system, and should be avoided.

BRIDGE NO. 1079

Amtrak over Routes 150 and 71, Wallingford

Description: c.1870, 1-span ashlar-masonry arch.

Similar Structures in Preservation Plan: There are seven other 19th-century masonry-arch bridges in the Plan that originally carried a railroad: 3682, 1617, and five other bridges that carry or cross public rights-of-way but do not have ConnDOT bridge numbers -- River Road in Colchester, Field Point Road and Arch Street in Greenwich, Kinsman Road Extension in Lisbon, and Middle Haddam Road in Portland.

Historical Significance: A well-preserved example of the heavy masonry construction, with finely finished stone throughout, employed in 19th-century railroad bridges; important historical association with the New Haven Railroad's consolidation of rail transportation in the state.

Preservation Planning:

General Considerations: Any future consideration on the part of ConnDOT for its replacement would likely derive from the vertical roadway clearance (10'-5"), roadway width (16'), or major reconfiguration of the present traffic system that features an intersection immediately south of the bridge. Any action addressing these matters would probably threaten the bridge.

Structural Rehabilitation: Repointing or replacement of stones should duplicate existing material as closely as possible in composition, tint and tooling.

BRIDGE NO. 5159

Romford Road over Bantam River, Washington

Description: 1888, wrought-iron lenticular pony truss, 1 span; supported on steel beams inserted below the deck, which resulted in removal of the original floor system.

Similar Structures in Preservation Plan: 2212, 4500, 4534, 4575, 5038, 5065, 5191

Historical Significance: This bridge is significant as one of eight Berlin Iron Bridge Co. lenticular pony trusses in the Preservation Plan. It retains many characteristic details, such as nut-connected portal joints, relatively light built-up web members, and pinned panel joints. The bridge is closed to traffic, and effectively bypassed.

Preservation Planning:

Widening: The floor system is the historic fabric that is lost in widening a truss. Since the original floor system has already been removed from this bridge, it would not have to be considered in widening. At only 18' width, it is conceivable that widening to the standard minimum of 28' might be recommended for this crossing in the future. Up to that roadway width, the trusses should remain in place. On a wider bridge, the trusses might take on a ludicrous appearance, as vestigial ornamentation on a thoroughly modern structure.

Guardrails: The trusses now serve in effect as guardrails. New roadway barriers would compromise the appearance of the old trusses, but would also help to protect them from collision. Any new roadway barrier should leave the trusses in place, and preferably would not be attached to them.

Structural Rehabilitation: Since the trusses do not carry load, this is not a concern. Replacing the existing secondary structural system of steel beams presents no preservation problems, as long as the above-noted concerns about widening and guardrails are taken into account.

Relocation: The small size of the bridge makes it a good candidate for relocation as a pedestrian or park bridge. Also, the significance of this truss is based more on its intrinsic technology than on its location. The location, however, is not completely without preservation significance, because it helps to demonstrate the wide distribution of lenticulars during the historic-use period.

Bypass: This does not appear to be a meaningful option for preservation because a critical element of the historic structure -- the floor system -- has already been removed.

BRIDGE NO. 1117

West Main Street over Naugatuck River, Waterbury

Description: Three-span concrete arch with raised arch rings, recessed panels on piers, and finely-cut granite railings, 1922.

Similar Structures in Preservation Plan: concrete arches of similar date and level of ornamental detail include Bridges Nos. 1591, 1537, 4992, 3645, 948, 992, 963, 5041, and 4166.

Historical Significance: Significant as an example of the monumental arched bridges of the early 20th century; one of three "City Beautiful" arches in Waterbury.

Preservation Planning:

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of exterior damage should seek to match existing concrete in terms of form, surface texture, and color. Similarly, rehabilitation should seek to duplicate the existing stonework of the railing as closely as possible. Sealers on historic concrete and stonework are not recommended: impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge. Penetrating, semi-permeable sealers may reduce the effects of weathering on concrete; however, most concrete damage is due to moisture from the roadway, not weather. In addition to erosion effects, water penetration results in freeze-thaw damage and corrosion-expansion of reinforcing road. Impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge. main threat to the bridge.

Structural Rehabilitation: This bridge primarily has interest because of its decorative features. Massive structural replacement of the arch would diminish its integrity, but much of the bridge's significance would remain if the raised ring, spandrels, and parapets were kept intact.

Widening: Given the present roadway width (44'), it is unlikely that additional width will be required. Widening the bridge would destroy its integrity unless it was accompanied by a completely accurate rebuilding of the stone arch ring, spandrel and parapet on the widened side.

Guardrail: The roadway presently relies on the parapets for roadway protection, and they would seem to serve adequately in terms of crash strength and freedom from snag points. If additional protection were required, guardrail could be installed between the shoulders and sidewalk. Because the parapets are a prominent visual feature, they should be kept unobscured as much as possible

Bypass: Building density and the established street pattern will make it difficult to bypass this structure with a wide roadway.

BRIDGE NO. 4166

Freight Street over Naugatuck River, Waterbury

Description: Two-span concrete arch with rough-hewn stone rings and granite-ashlar spandrels, railing, and alcove benches, 1926.

Similar Structures in Preservation Plan: concrete arches of similar date and level of ornamental detail include Bridges Nos. 1591, 1537, 4992, 3645, 948, 992, 963, 5041, and 1117.

Historical Significance: Significant as an example of the monumental arched bridges of the early 20th century; one of three "City Beautiful" arches in Waterbury.

Preservation Planning:

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of exterior damage should seek to duplicate the existing stonework as closely as possible, and replacement mortar should match the historic mortar in color, composition (especially the lime-cement ratio), and joint tooling. Sealers on historic stonework are not recommended: impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: This bridge primarily has interest because of its stonework. Massive structural replacement of the arch would diminish its integrity, but much of the bridge's significance would remain if the ringstones, spandrels, parapets, and alcoves were kept intact.

Widening: Given the present roadway width (44'), it is unlikely that additional width will be required. Widening the bridge would destroy its integrity unless it was accompanied by a completely accurate rebuilding of the stone arch ring, spandrel and parapet on the widened side.

Guardrail: The roadway presently relies on the parapets for roadway protection, and they would seem to serve adequately in terms of crash strength and freedom from snag points. If additional protection were required, guardrail could be installed between the shoulders and sidewalk. Because the parapets are a prominent visual feature, they should be kept unobscured as much as possible

Bypass: Building density and the established street pattern will make it difficult to bypass this structure with a wide roadway.

BRIDGE NO. 4534

Washington Avenue over Mad River, Waterbury

Description: 1878, wrought-iron lenticular pony truss, 1 span; supported on steel beams inserted below the deck, which resulted in removal of the original floor system; retains original railing and cast-iron newel posts.

Similar Structures in Preservation Plan: 2212, 4500, 4575, 5038, 5065, 5159, 5191

Historical Significance: This bridge is the oldest Berlin Iron Bridge Co. lenticular pony truss known to survive; it dates from the firm's first year of bridge construction. It retains many details that were superseded on the company's trusses by the mid-1880s, such as the mid-panel joining of the top chord. The floor system was removed when the new structural system of steel beams was placed beneath the deck.

Preservation Planning:

Widening, Bypass: The tightly constrained site, with buildings close to all four corners of the bridge, obviate any practicality for these options.

Guardrails: Modern W-rail attached to the trusses serve as roadway barriers. Any renewal of this system should be limited to the present extent of new material.

Relocation: Like all the lenticular pony trusses, this bridge is a good candidate for relocation as a pedestrian or park bridge because of its small size. It is perhaps the most significant structures in this Plan because of its intrinsic importance as the earliest survivor of its type. Nonetheless, its location is Waterbury is notable because of that city's extraordinary reliance on Berlin lenticular trusses in the 19th century.

BRIDGE NO. 5038

Sheffield Street over Hancock Brook, Waterbury

Description: 1890, wrought-iron lenticular pony truss, 1 span.

Similar Structures in Preservation Plan: 2212, 4500, 4534, 4575, 5065, 5159, 5191

Historical Significance: This bridge is significant as one of eight Berlin Iron Bridge Co. lenticular pony trusses in the Preservation Plan. It retains many characteristic details, such as relatively light built-up web members and pinned panel joints. Except for minor patching on the floor beams, it stands virtually intact.

Preservation Planning:

General Considerations: This bridge provides access to a single house, southeast of the crossing. Except for fire-vehicle access, there would appear to be little reason to require its structural or functional upgrade.

Structural Rehabilitation: Replacing wrought iron members with similar parts in steel could increase the load-bearing capacity, but would not address width or alignment.

Bypass: The lack of nearby buildings would make this a feasible option. Bypass plans should consider some continuing maintenance for the historic bridge.

Relocation: This bridge is a good candidate for relocation because of its small size and high intrinsic significance. Its location in Waterbury contributes secondarily to its significance, because that city was a major customer for such trusses in the late 19th century.

Secondary Structure: Inserting a new load-bearing system below the deck would cause the removal of the historic floor system and is not recommended for that reason.

BRIDGE NO. 5041

Huntingdon Avenue over Steele Brook, Waterbury

Description: Two-span concrete arch with rough-hewn stone rings and random-ashlar spandrels and railing with medieval embrasures, 1935.

Similar Structures in Preservation Plan: concrete arches of similar date and level of ornamental detail include Bridges Nos. 1591, 1537, 4992, 3645, 948, 992, 963, 4166, and 1117.

Historical Significance: Significant as an example of the monumental arched bridges of the early 20th century; one of three "City Beautiful" arches in Waterbury.

Preservation Planning:

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of exterior damage should seek to duplicate the existing stonework as closely as possible, and replacement mortar should match the historic mortar in color, composition (especially the lime-cement ratio), and joint tooling. Sealers on historic stonework are not recommended: impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: This bridge primarily has interest because of its stonework. Massive structural replacement of the arch would diminish its integrity, but much of the bridge's significance would remain if the ringstones, spandrels, and parapets were kept intact.

Widening: Given the present roadway width (38'), it is unlikely that additional width will be required. Widening the bridge would destroy its integrity unless it was accompanied by a completely accurate rebuilding of the stone arch ring, spandrel and parapet on the widened side.

Guardrail: The roadway presently relies on the parapets for roadway protection, and they would seem to serve adequately in terms of crash strength and freedom from snag points. If additional protection were required, guardrail could be installed between the shoulders and sidewalk. Because the parapets are a prominent visual feature, they should be kept unobscured as much as possible

Bypass: The difficult intersection on the west side and the established street pattern will make it difficult to bypass this structure with a wide roadway.

BRIDGE NO. 4408

Skilton Road over Nonewaug River, Watertown

Description: 1865, stilted masonry arch with cut ring stones and rubble spandrels; concrete roadway barriers.

Similar Structures in Preservation Plan: 4619, 1401, 3671, 2241, 4700, 4704, 3793, 4839, 3879, 4138, 4130, 4754, 2305, 4555, 4408; Bates Avenue, Putnam

Historical Significance: Well-preserved example of vernacular 19th-century arch-bridge construction. New roadway barriers detract from historical appearance but apparently did not cause the removal of any historic fabric.

Preservation Planning:

General Considerations: Concrete footings at west end indicate recent reworking to stabilize the structure.

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry ring and spandrel of the north side are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

Widening: Widening to one side could cause the loss, or at least the loss of visibility, of one spandrel and parapet, and may well constitute an adverse effect. Leaving one side fully intact may, however, constitute acceptable mitigation.

Bypass: Mostly isolated location would lend itself to total bypass or lane division.

BRIDGE NO. 349

Route 1 over Patchaug River, Westbrook

Description: 1929, steel Pratt through truss, 1 truss span; 5 concrete-encased steel-beam approach spans; fabricated by American Bridge Co.

Similar Structures in Preservation Plan:

Trusses, 1921 and Later: 1496, 3788, 562, 1649, 1524, 1487, 1561, 4434, 507, 1415

Through Trusses, 1921 and Later: 1496, 3788, 1649, 1487, 1561, 507

Pratt Trusses, 1921 and Later: 1561, 1415

American Bridge Co. Trusses: 3788, 562

Historical Significance: Typifies truss-bridge construction during the automotive age. Built under the state Highway Department's trunk-line bridge program, which addressed Route 1 as its highest priority from the start of the program.

Preservation Planning:

Structural Rehabilitation: Selective patching and in-kind replacement of members would not compromise the structure's historic integrity.

Bypass: This option appears impossible at this tightly constrained crossing over a tidal inlet.

Relocation: The length of the truss span (116') appears to make it feasible to relocate, although identifying a trail or park location that could accept a span that long would be difficult.

BRIDGE NO. 3651

North Main Street over Trout Brook, West Hartford

Description: 3 small (15') shallow-arched spans, paneled railing.

Similar Structures in Preservation Plan: None of this early date.

Historical Significance: This is the earliest known surviving concrete bridge in Connecticut; in fact, it was probably among the first built in the state, since the Town of West Hartford's concrete bridge program was considered pioneering at the time.

Preservation Planning:

General Considerations: The roadway at this point consists of four lanes plus sidewalks. While traffic is often heavy and fast at this location, this is not a problem unique to the bridge; all of this stretch of North Main Street appears to be burdened with too many cars in a hurry. If North Main Street is to maintain its residential character, some comprehensive traffic planning for this whole part of town is needed.

Maintenance: The continued survival of concrete bridges depends primarily on the control of moisture, reduction of salt penetration, and prompt repair of scour and spalling. Roadway drains and proper direction of run-off, installation of roadway membrane, and reduced road salt will contribute to a longer life for the bridge. Repair of spalling and scour should seek to duplicate the form, color, and surface texture of existing concrete. Penetrating, semi-permeable sealers can assist in reducing weathering. However, most concrete damage is due to moisture from the roadway, not weather. In addition to erosion effects, water penetration results in freeze-thaw damage and corrosion-expansion of reinforcing road. Impermeable sealers will trap moisture and ultimately accelerate the destruction of the bridge.

Structural Rehabilitation: This bridge's significance derives from the fact that it is such an early example of concrete construction. Unlike the Merritt bridges, which can be structurally reconstructed with little effect on their significance (which is primarily visual), substantial reconstruction of these arches would destroy their integrity, rendering them merely commemorative. If they should become so deteriorated that selective rehabilitation could no longer upgrade them, they should be photographed in detail, including photographs during demolition, in order to show such features as the reinforcing system and cross section of the concrete.

Widening. If additional width were needed for North Main Street, widening the bridge, to one side only, would be preferable to outright demolition. Widening, however, will result in the loss of one railing.

Guardrail. Presently there are no roadway barriers other than the concrete railings. If it were determined that additional protection were needed, installation of metal guardrail between the sidewalk and the road would be preferable to altering the concrete railing. The second choice, from a historic preservation point of view, would be installing guardrail against the concrete railing.

Bypass: The density of residential development would make it difficult to reroute a four-lane road at this location.

BRIDGE NO. 1349
(SAUGATUCK RIVER BRIDGE)

Route 136 over Saugatuck River, Westport

Description: Wrought-iron Pratt through truss swing bridge, 1884, with fixed approach span.

Similar Structures in Preservation Plan: the earliest of three remaining swing bridges in the state. The others are the 1913 East Haddam Bridge (1138) and Pleasure Beach Bridge in Bridgeport (4455).

Historical Significance: rare early example of movable bridge technology by Union Bridge Company, a pioneering fabricator of swing bridges.

Preservation Planning:

General Considerations: At the time of this report, the bridge was being repaired off-site preparatory to re-erection. It is not known what the character of the final rehabilitation will be. The following considerations assume that the historical dimensions and material of the bridge will remain. The approach span should be considered an integral part of the historic bridge.

Mechanism: The unique hand-driven drive mechanism of the bridge should be preserved intact as much as possible, replacing components in kind as needed when they wear out.

Maintenance: Like any metal bridge, this one will have its life extended by reduction of road salt, periodic washing, and a regular paint cycle.

Structural Rehabilitation: In any future upgrading of this bridge, selective replacement of members with like material will have little impact on the bridge's integrity. The choice of deck material is not of great historical importance.

Guardrail: installation of metal guardrail on the truss will not affect its integrity.

Widening: Not practical, either through modification of the existing span or construction of parallel span, if the requirement of maintaining it as a movable bridge remains.

Bypass: Not practical given the congested setting.

Relocation: Not practical.

BRIDGE NO. 3852

Hales Road over Metro North Railroad, Westport

Description: 1891, steel Warren pony truss, 1 span.

Similar Structures in Preservation Plan: 3674, 3846

Historical Significance: As part of one of the nation's earliest systematic truss-bridge construction programs, this span has high intrinsic significance. Its many archaic details include single-ply members with no flanges, outboard sway bracing, and portal joints where all the members do not meet around a common point. It is also important as part of Connecticut's most critical rail corridor.

Preservation Planning:

General Considerations: At 27' wide, this bridge is substantially wider than similar surviving examples. Light construction could raise questions regarding load capacity. Any work on the bridge will be complicated by the railroad's electrical-transmission system, which is suspended from the structure. Nearby alternative crossings are available to the east and west.

Structural Rehabilitation: It is possible that selective patching or selective in-kind replacement of members could increase load capacity without impairing historic integrity. However, installing members of different cross-section than existing, or reconfiguring the joints, would seriously detract from the bridge's intrinsic significance.

Widening/Secondary Structure: A new below-deck structural system might be feasible to provide either greater width or load capacity. If this option is pursued, a portion (one or two feet) of the outer ends of the floor beams should be left in place, including the original floor joints; this would retain the distinctive technology embodied in these joints, and help to hide the new material.

Bypass: relatively low building density in the immediate vicinity would appear to permit close-by bypass. However, Hales Road crosses I-95 immediately north of this bridge, and bypass would create an offset alignment between the two bridges.

Relocation: The high intrinsic significance and relatively short length make this bridge a good candidate for relocation to a park or trail setting.

BRIDGE NO. 1850

Windham Road (Route 601) over Willimantic River and millrace, Willimantic, Windham

Description: 1869, 2-span arch bridge of ashlar masonry.

Similar Structures in Preservation Plan: 979, 4125, 1852

Historical Significance: Substantial and well-preserved masonry bridge, associated with the industrial development of Willimantic.

Preservation Planning:

General Considerations: Plans are already in place to bypass this crossing for through traffic; site-selection for the new bridge is under study at this time (February 1991). Because the bypass will be remote from this site, this bridge appears likely to continue in use for local traffic, and its continued maintenance will remain a matter of preservation concern. Planning for the old bridge will also have to take into account any impact on the potentially eligible mill complex nearby.

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry arch and spandrels are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

Railing. Any new roadway barriers should leave the masonry parapets in place and, to the extent possible, visible.

BRIDGE NO. 1852

Route 32 (Bridge Street) over Willimantic River, Willimantic, Windham

Description: 1868, 1-span arch bridge with cut ring stones and rubble spandrels.

Similar Structures in Preservation Plan: 979, 4125, 1850

Historical Significance: Substantial and well-preserved masonry bridge, associated with the industrial development of Willimantic.

Preservation Planning:

General Considerations: Width (27') is close to recommended standard.

Structural Rehabilitation: Embedding a concrete structure in the arch would not compromise historic integrity, so long as the masonry arch and spandrels are left intact and visible. Less preferable would be a concrete arch added under the barrel, although if set back from the spandrel and built to minimum feasible depth it may not be considered an adverse effect. Repointing should duplicate existing mortar as closely as possible in composition, tint and tooling.

Bypass/Widening: There appears to be ample right-of-way available southeast of the bridge for either of these options. Because the northwest side has a sidewalk added to it, any anticipated widening should be sufficient to provide a sidewalk on the opposite side, and should remove the present sidewalk so that one side of the historic bridge would be visible.

BRIDGE NO. 3258 and 3259

Route 601 over factory pedestrian walks, Willimantic, Windham

Description: 19th-century masonry arches connecting factory buildings in the Willimantic Linen/American Thread complex that stand on opposite sides of the public highway.

Similar Structures in Preservation Plan: These are the only two bridges of this type.

Historical Significance: Typical masonry construction of the 19th century, significance primarily based on the extent to which they would be deemed to contribute to the National register-eligible mill complex.

Preservation Planning:

General Considerations: If ConnDOT ever considers a major structural upgrade of this roadway, it is possible these bridges would be impacted. In that event, the effect on the complex as a whole will be the overriding concern. Widening the roadway would cause the loss of historic mill buildings, and would achieve little given the difficult intersections to either side of these bridges.

BRIDGE NO.4422

Papermill Road over Weekeepeemee River, Woodbury

Description: Wrought-iron through plate-girder span, 1893; original pipe rails mounted on top of girders.

Similar Structures in Preservation Plan: None.

Historical Significance: Significant as an early example of beam bridge, earliest known purely highway use (not railroad overpass) of plate-girders or other beams.

Preservation Planning:

General Considerations: This bridge is presently out-of-service. Since its significance primarily derives from the fact that it is an early example of beam bridge construction, any serious modification, such as widening or structural rehabilitation, will destroy its only claim to historical interest. By the same token, it loses little by being relocated to another site.

Return to service: It is doubtful that the limited load-carrying capacity of the girders and the bridge's narrow width (16') will allow it to be returned to use as a vehicular bridge. If so, it should be subject to regular salt-removal and painting.

Bypass: This road used to serve as a connection between Routes 132 and 47; bypass appears feasible at a number of points and might additionally provide better road alignment.

Relocation: Probably easiest to move of all bridges; since its significance is primarily as an illustration of the early use of a technique, its relocation will preserve most of its meaning.

BRIDGE NO. 5065

Minor Town Road over Nonewaug River, Woodbury

Description: 1890, wrought-iron lenticular pony truss, 1 span.

Similar Structures in Preservation Plan: 2212, 4500, 4534, 4575, 5038, 5159, 5191

Historical Significance: This bridge is significant as one of eight Berlin Iron Bridge Co. lenticular pony trusses in the Preservation Plan. It retains many characteristic details, such as nut-connected portal joints, tapered floor beams, relatively light built-up web members, and pinned panel joints. Except for minor patching on the floor beams, it stands virtually intact.

Preservation Planning:

Structural Rehabilitation: Replacing wrought iron members with similar parts in steel could increase the load-bearing capacity, but would not address width.

Bypass: The lack of nearby buildings would make this a feasible option. Bypass plans should consider some continuing maintenance for the historic bridge.

Relocation: This bridge is a good candidate for relocation because of its small size and high intrinsic significance. If one of both of the similar bridges in Waterbury were retained in place in perpetuity, this region would not be lacking in such structures if this one were moved.

Secondary Structure: Inserting a new load-bearing system below the deck would cause the removal of the historic floor system and is not recommended for that reason.

APPENDIX A

List of Bridges in the Preservation Plan

(Alphabetical by name of town)

DOT#	TOWN	ROAD	DATE	NR STATUS
1496	Barkhamsted	Route 318 and 181	1939	Eligible
1591	Barkhamsted	Route 318	1940	Part of el. resource
3788	Beacon Falls	Depot Street	1935	Eligible
1508	Bloomfield	Route 189	1913	Eligible
325	Bridgeport	Route 1- Boston Avenue	1910	Eligible
3637	Bridgeport	Stratford Avenue	1929	Eligible
4251	Bridgeport	Congress Street	1911	Eligible
4252	Bridgeport	E. Washington Ave.	1925	Eligible
4455	Bridgeport	Central Avenue	1924	Eligible
900	Brookfield	Route 25	1920	Eligible
562	Canaan	Route 7	1931	Eligible
1649	Canterbury	Route 668	1937	Eligible
5222	Canton	Town Bridge Road	1895	Eligible
1537	Chaplin	Route 198	1926	Eligible
	Colchester	River Road	1887	Listed
5144	Colebrook	Wolford Hill Road	1915	Eligible
4619	Columbia-Lebanon	Village Hill Road	1870c	Eligible

560	Cornwall	Routes 7 and 4	1930	Eligible
1338	Cornwall-Sharon	Route 128	1841	Listed
4622	Coventry-Mansfield	Flanders Road	1914	Eligible
4125	Danbury	Crosby Street	1899	Eligible
4992	Darien	Rings End Road	1930	Eligible
1603	East Haddam	Route 434	1937	Part of el. resource
1604	East Haddam	Route 434	1937	Part of el. resource
1605	East Haddam	Route 434	1937	Part of el. resource
1138	East Haddam-Haddam	Route 82	1913	Eligible
4496	East Hartford	Forbes Street	1903	Eligible
1524	East Windsor	Route 191	1925	Eligible
4500	East Windsor	Melrose Road No. 2	1888	Eligible
1487	Farmington	Route 177	1939	Eligible
1401	Glastonbury	Route 160	1870c	Eligible
3671	Glastonbury	Naubuc Avenue	1871	Eligible
3674	Greenwich	Byram Road	1893	Eligible
3846	Greenwich	Drinkwater Place	1895	Eligible
5011	Greenwich	Shore Road #1	1905	Eligible
	Greenwich	Field Point Road	1894	Eligible
	Greenwich	Arch Street	1870+	Eligible
362	Groton-Stonington	Route 1	1922	Eligible
2241	Groton-Stonington	Route 27	1870c	Potential district
979	Hartford	Route 44	1871	Eligible
3781	Hartford	Walnut Street	1907	Eligible

977	Hartford	Route 44	1906	Eligible
1626	Hartford	Main Street	1833	Listed
980A	Hartford-East Hartford	Route 84	1908	Eligible
4453	Kent	Bulls Bridge Road	1842	Listed
4700	Killingly	Peep Toad Road	1850c	Eligible
4704	Killingly	Attawaugan Road	1860c	Eligible
1132	Killingworth-Madison	Route 80	1934	Eligible
	Lisbon	Kinsman Road Ext.	1850c	Eligible
3793	Manchester	North Main Street	1869c	Eligible
	Manchester	Hartford Road	1900c	Eligible
4149	Manchester	Spring Street	1905	Potential district
4727	Mansfield	Mount Hope Road	1901	Eligible
4839	Meriden	Cooper Street	1892	Eligible
639	Middletown	Route 9	1910	Eligible
524	Middletown-Portland	Route 66	1938	Eligible
1328	Milford	Route 162-New Haven Avenue	1889	Eligible
3645	Milford	River Street	1934	Eligible
327	Milford-Stratford	Route 1	1921	Eligible
1843	Monroe-Oxford	Route 34	1919	Part of el. resource
1860	Montville	Route 433	1936	Part of el. resource
4214	Naugatuck	Maple Avenue	1912	Eligible
5217	New Britain	Stanley Quarter	1925	Eligible

Park Road

5218	New Britain	Stanley Park Rd."C"	1936	Eligible
1561	New Hartford	Route 219	1930	Eligible
4434	New Hartford	Black Bridge Road	1936	Eligible
3752	New Haven	Olive Street	1907	Eligible
3806	New Haven	Chapel Street	1882	Eligible
3808	New Haven	Edgewood Avenue	1910	Eligible
3873	New Haven	Court Street	1907	Eligible
3879	New Haven	Clifton Street	1885c	Eligible
4138	New Haven	Wintergreen Avenue	1890	Eligible
3998	New Haven	Ferry Street	1912	Eligible
507	Newtown-Southbury	Glen Road-Route 816	1934	Eligible
	Norwalk	Railroad over South Main Street	1896	Eligible
4130	Norwalk	Perry Avenue	1899	Eligible
4155	Norwalk	Glover Avenue	1912	Eligible
4746	Norwich	Sunnyside Street	1908	Eligible
1415	Norwich-Lisbon	Route 169	1938	Eligible
948	Orange	Route 34	1942	Eligible
4402	Plainfield	Brunswick Avenue	1886	Eligible
4403	Plainfield	River Street #1	1886	Eligible
4754	Plainfield	Packerville Road	1850c	Eligible
4139	Plymouth	Tunnel Rd., Allen & S.Main Sts.	1910	Eligible
	Portland	Middle Haddam Road	1890c	Eligible
992	Putnam	Route 44-Pomfret St.	1925	Eligible
	Putnam	Bates Avenue	1840c	Eligible

	Putnam	Arch Street	1901	Eligible
963	Salisbury	Route 41	1929	Eligible
2305	Salisbury	Route 44	1873	Eligible
5191	Sharon	Sharon Station Road	1885	Eligible
1659	Shelton-Derby	Bridge Street	1918	Eligible
4555	Somers	Maple Street	1880c	Potential district
4779	Stafford	Spring Street	1912	Eligible
2212	Stamford	Main Street	1888	Listed
3682	Stamford	South State Street	1847	Eligible
4182	Stonington-Westerly (RI)	White Rock Road	1906	Eligible
455	Suffield	Route 159	1929	Eligible
603	Thomaston	Waterbury Road-Route 848	1930	Eligible
1617	Vernon	Tunnel Road	1849	Eligible
4575	Vernon	Main Street	1891	Eligible
1079	Wallingford	Routes 150 & 71 (Main St.)	1870c	Eligible
5159	Washington	Romford Road	1888	Eligible
4166	Waterbury	Freight Street	1925	Eligible
4534	Waterbury	Washington Avenue	1878	Eligible
5038	Waterbury	Sheffield Street	1890	Eligible
5041	Waterbury	Huntingdon Avenue	1935	Eligible
1117	Waterbury	West Main Street	1922	Eligible
4408	Watertown	Skilton Road	1865	Eligible
3651	West Hartford	North Main Street	1901	Eligible
349	Westbrook	Route 1	1925	Eligible
3852	Westport	Hales Road	1891	Eligible

319	Westport	Route 1	1917	Eligible
1349	Westport	Route 136	1884	Listed
1850	Windham	Windham Road- Route 601	1869	Eligible
1852	Windham	Route 32-Bridge St.	1868	Eligible
3258	Windham	Windham Road- Route 601	1895c	Eligible complex
3259	Windham	Route 601	1864	Eligible complex
4422	Woodbury	Papermill Road	1893	Eligible
5065	Woodbury	Minor Town Road	1890	Eligible

APPENDIX B

Preservation Plan Bridges, By Type

Lenticular Pony Trusses

4500	East Windsor	Melrose Road No. 2	1888	Eligible
5191	Sharon	Sharon Station Road	1885	Eligible
2212	Stamford	Main Street	1888	Listed
4575	Vernon	Main Street	1891	Eligible
5159	Washington	Romford Road	1888	Eligible
4534	Waterbury	Washington Avenue	1878	Eligible
5038	Waterbury	Sheffield Street	1890	Eligible
5065	Woodbury	Minor Town Road	1890	Eligible

Lenticular Through Trusses

4402	Plainfield	Brunswick Avenue	1886	Eligible
4403	Plainfield	River Street #1	1886	Eligible

New Haven Railroad Early Pony Trusses

3674	Greenwich	Byram Road	1893	Eligible
3846	Greenwich	Drinkwater Place	1895	Eligible
3852	Westport	Hales Road	1891	Eligible

Timber Trusses

1338	Cornwall-Sharon	Route 128	1841	Listed
4453	Kent	Bulls Bridge Road	1842	Listed

Appendix B-189

Early 20th-Century Town-Highway Trusses

5144	Colebrook	Wolford Hill Road	1915	Eligible
4622	Coventry-Mansfield	Flanders Road	1914	Eligible
4727	Mansfield	Mount Hope Road	1901	Eligible

Early 20th-Century Highway Trusses Over Railroads

3781	Hartford	Walnut Street	1907	Eligible
3752	New Haven	Olive Street	1907	Eligible
3998	New Haven	Ferry Street	1912	Eligible

Trusses, 1921 and Later

1496	Barkhamsted	Route 318 and 181	1939	Eligible
3788	Beacon Falls	Depot Street	1935	Eligible
562	Canaan	Route 7	1931	Eligible
1649	Canterbury	Route 668	1937	Eligible
1524	East Windsor	Route 191	1925	Eligible
1487	Farmington	Route 177	1939	Eligible
1561	New Hartford	Route 219	1930	Eligible
4434	New Hartford	Black Bridge Road	1936	Eligible
507	Newtown-Southbury	Glen Road-Route 816	1934	Eligible
1415	Norwich-Lisbon	Route 169	1938	Eligible
349	Westbrook	Route 1	1925	Eligible

<u>19th-Century Simple Masonry Highway Arches</u>

4619	Columbia-Lebanon	Village Hill Road	1870c	Eligible
1401	Glastonbury	Route 160	1870c	Eligible
3671	Glastonbury	Naubuc Avenue	1871	Eligible
2241	Groton-Stonington	Route 27	1870c	Potential district
4700	Killingly	Peep Toad Road	1850c	Eligible
4704	Killingly	Attawaugan Road	1860c	Eligible
3793	Manchester	North Main Street	1869c	Eligible
4839	Meriden	Cooper Street	1892	Eligible
3879	New Haven	Clifton Street	1885c	Eligible
4138	New Haven	Wintergreen Avenue	1890	Eligible
4130	Norwalk	Perry Avenue	1899	Eligible
4754	Plainfield	Packerville Road	1850c	Eligible
	Putnam	Bates Avenue	1840c	Eligible
2305	Salisbury	Route 44	1873	Eligible
4555	Somers	Maple Street	1880c	Potential district
4408	Watertown	Skilton Road	1865	Eligible

19th-Century Large or Decorative Highway Stone Arches

4125	Danbury	Crosby Street	1899	Eligible
979	Hartford	Route 44	1871	Eligible
1850	Windham	Windham Road-Route 601	1869	Eligible
1852	Windham	Route 32-Bridge St.	1868	Eligible

19th-Century Rail-Carrying Stone Arches

	Colchester	River Road	1887	Listed
	Greenwich	Field Point Road	1894	Eligible
	Greenwich	Arch Street	1870+	Eligible
	Lisbon	Kinsman Road Ext.	1850c	Eligible
	Portland	Middle Haddam Road	1890c	Eligible
3682	Stamford	South State Street	1847	Eligible
1617	Vernon	Tunnel Road	1849	Eligible
1079	Wallingford	Routes 150 & 71	1870c	Eligible

Simple 20th-Century Stone Arches

900	Brookfield	Route 25	1920	Eligible
5011	Greenwich	Shore Road #1	1905	Eligible
	Manchester	Hartford Road	1900c	Eligible
4149	Manchester	Spring Street	1905	Potential district
	Putnam	Arch Street	1901	Eligible

Decorative 20th-Century Stone Arches

4779	Stafford	Spring Street	1912	Eligible
4155	Norwalk	Glover Avenue	1912	Eligible
4746	Norwich	Sunnyside Street	1908	Eligible

Stone-Arch Factory Passages

3258	Windham	Route 601-Windham Rd.	1895c	Eligible mill complex
3259	Windham	Route 601	1864	Eligible mill complex

Simple Highway Concrete Arches, 1920 and Before

1508	Bloomfield	Route 189	1913	Eligible
325	Bridgeport	Route 1- Boston Avenue	1910	Eligible
3873	New Haven	Court Street	1907	Eligible
3651	West Hartford	North Main Street	1901	Eligible

Decorative Concrete Arches, 1920 and Before

4496	East Hartford	Forbes Street	1903	Eligible
977	Hartford	Route 44	1906	Eligible
4214	Naugatuck	Maple Avenue	1912	Eligible
3808	New Haven	Edgewood Avenue	1910	Eligible

Decorative Concrete Arches, 1921 and Later

1591	Barkhamsted	Route 318	1940	Part of el. resource
1537	Chaplin	Route 198	1926	Eligible
4992	Darien	Rings End Road	1930	Eligible
3645	Milford	River Street	1934	Eligible
948	Orange	Route 34	1942	Eligible
992	Putnam	Route 44-Pomfret St.	1925	Eligible
963	Salisbury	Route 41	1929	Eligible
4166	Waterbury	Freight Street	1925	Eligible
5041	Waterbury	Huntingdon Avenue	1935	Eligible
1117	Waterbury	West Main Street	1922	Eligible

Open-Spandrel Concrete Arches

560	Cornwall	Routes 7 and 4	1930	Eligible
455	Suffield	Route 159	1929	Eligible
1132	Killingworth-Madison	Route 80	1934	Eligible
603	Thomaston	Waterbury Road-Route 848	1930	Eligible

Park Bridges

5217	New Britain	Stanley Quarter Park Road	1925	Eligible
5218	New Britain	Stanley Park Rd. "C"	1936	Eligible
1860	Montville	Route 433	1936	Part of el. resource
1603	East Haddam	Route 434	1937	Part of el. resource
1604	East Haddam	Route 434	1937	Part of el. resource
1605	East Haddam	Route 434	1937	Part of el. resource

Bascule Bridges

3637	Bridgeport	Stratford Avenue	1929	Eligible
4251	Bridgeport	Congress Street	1911	Eligible
4252	Bridgeport	E. Washington Ave.	1925	Eligible
362	Groton-Stonington	Route 1	1922	Eligible

Swing Bridges

4455	Bridgeport	Central Avenue	1924	Eligible
1138	East Haddam-Haddam	Route 82	1913	Eligible
1349	Westport	Route 136	1884	Listed

Unique Structures

5222	Canton	Town Bridge Road	1895	Eligible
980A	Hartford-East Hartford	Route 84	1908	Eligible
1626	Hartford	Main Street	1833	Listed
524	Middletown	Route 66	1938	Eligible
639	Middletown	Route 9	1910	Eligible
1328	Milford	Route 162-New Haven Avenue	1889	Eligible
327	Milford-Stratford	Route 1	1921	Eligible
1843	Monroe-Oxford	Route 34	1919	Part of el. resource
3806	New Haven	Chapel Street	1882	Eligible
	Norwalk	Railroad over South Main Street	1896	Eligible
4139	Plymouth	Tunnel Rd., Allen & S.Main Sts.	1910	Eligible
1659	Shelton-Derby	Bridge Street	1918	Eligible
4182	Stonington-Westerly (RI)	White Rock Road	1906	Eligible
319	Westport	Route 1	1917	Eligible
4422	Woodbury	Papermill Road	1893	Eligible

APPENDIX C

MARKETING PLAN

High Priority Bridges

Good candidates for relocation must have high intrinsic significance, i.e., they must embody technology worth preserving. Also, and obviously, the smaller the bridge the easier it will be to disassemble or to move whole. Pony trusses are more readily relocated than through trusses, because they have only one set of transverse members rather than two. The webs of smaller pony trusses might even be moved without disassembly. The only through trusses recommended below as relocation candidates are the two extant lenticular through trusses under ConnDOT jurisdiction, #4402 and #4403. At 120' and 101' span length, respectively, they are both considerably shorter than the lenticular through truss relocated by the Pennsylvania Department of Transportation in 1985 (Little Pine Creek Bridge, 221').

To maximize the effectiveness of the marketing program, we recommend that the following list of 18 bridges, including descriptive and dimensional data and information on the possible availability of funds for relocation, should be distributed to the organizations and agencies listed below. Disseminating the information well in advance of the bridges' replacement will increase the chances of success for a marketing program. At the same time, it must be understood that the bridges will not be candidates for relocation unless and until they are programmed for replacement, and that prior to such a finding the possibility of rehabilitation will be examined.

The present marketing plan generally provides a response period of 90 days or less. ConnDOT should consider substantially lengthening this response period. Alternatively, ConnDOT may also consider stockpiling the below-listed bridges for future relocation if immediate placement is not successful. Due to the small number of these good relocation candidates, such a stockpiling program could be planned within well-established limits. It is important to note that a stockpiling program would not be eligible for FHWA funding.

The following bridges are recommended as relocation candidates:

<u>Lenticular Pony Trusses</u>

#4500	East Windsor	Melrose Road No. 2
#5191	Sharon	Sharon Station Road
#2212	Stamford	Main Street
#4575	Vernon	Main Street
#5159	Washington	Romford Road
#4534	Waterbury	Washington Avenue
#5038	Waterbury	Sheffield Street
#5065	Woodbury	Minor Town Road

<u>Lenticular Through Trusses</u>

#4402	Plainfield	Brunswick Avenue
#4403	Plainfield	River Street #1

<u>Other Pony Trusses</u>

#5144	Colebrook	Wolford Hill Road
#4622	Coventry-Mansfield	Flanders Road
#3674	Greenwich	Byram Road
#3846	Greenwich	Drinkwater Place
#4727	Mansfield	Mount Hope Road
#4434	New Hartford	Black Bridge Road
#3806	New Haven	Chapel Street
#3852	Westport	Hales Road

<u>Girder Span</u>

#4422	Woodbury	Papermill Road

Interested Recipients

The consultants contacted numerous organizations to solicit their interest in receiving and using historic highway bridges. Following is a list of those who expressed interest in obtaining such a bridge.

Connecticut Department of Environmental Protection
Bureau of Parks and Forests
State Office Building
165 Capitol Avenue
Hartford, CT 06106

Attention: Joseph Hickey, Planner
566-2304

Comments: The Bureau is presently involved in planning several "heritage parks," which typically are located at river front sites and based on themes connected with urban and industrial history in the 19th and 20th centuries. Small, historically significant truss or beam bridges might have appropriate use within this program.

Connecticut Department of Environmental Protection
Office of Planning and Development
State Office Building
165 Capitol Avenue
Hartford, CT 06106

Attention: Robert Dlugolinski, Resource Coordinator
566-5518

Comments: The Resource Coordinator offers technical advice and serves as a clearinghouse for information for municipal park and recreation officials throughout the state.

Town of Berlin
Town Hall
240 Kensington Road
Berlin, CT 06037

Attention: Morgan Seelye, Town Engineer
828-7014 (Town Hall)

Cynthia Wilcox
Chair, Berlin Planning Commission
828-3383 (residence)

Comments: Berlin has a particular interest in the bridges of Berlin Iron Bridge Co. Furthermore, the town has recently adopted a plan to create a "greenway" along its Mattabessett River frontage, where the old bridges could serve very well. The Hon. Robert Peters, Mayor of Berlin, has also expressed an interest in receiving an old bridge, in discussion with the Town Engineer.

Appalachian Mountain Club
Mid-Atlantic Region
399 Main Street
Dalton, Mass. 01226

Attention: Dennis Regan, Regional Program Director
(413) 684-3900

Comments: The AMC is actively involved in development and maintenance of numerous trail systems, greenways and riverways. Mr. Regan identified two appropriate locations for small bridges (under 100' long) in existing or planned projects.

Connecticut Historical Society
1 Elizabeth Street
Hartford, CT 06105

Attention: Christopher Bickford, Director
236-5621

Comment: Over the last four years CHS has expanded its collection and program policies aggressively to include industrial material (among other themes). At present, CHS is also planning renovations to its building and grounds. The Museum Advisory Committee responded positively to the idea of acquiring a significant truss bridge for display, and possibly pedestrian use, on the grounds.

Connecticut Land Trust Service Bureau
55 High Street
Middletown, CT 06457

Attention: Lesley Olsen, Coordinator
344-0716

Comments: Ms. Olsen serves as technical advisor and information clearinghouse for the more than 110 local land trusts in the state, which generally promote active use of their holdings. The more active land trusts build and maintain trail systems that often require short span bridges. Ms. Olsen maintains a database of land-trust officers, and issues a newsletter. (Note: One bridge included in the inventory phase of this project already serves as a pedestrian crossing on local land trust property in Brookfield.)

Town of Thompson
Box 899
North Grosvenordale, CT 06255

Attention: Donald Williams, First Selectman
923-9561

Comment: The town has proposed to create Riverside Park along the French River in North Grosvenordale, adjacent to the Three Rows mill-house neighborhood presently under renovation sponsored by Rural Homes, Ltd. and the Connecticut Department of Housing. The architect for the housing rehabilitation has recommended placing two footbridges over the river to facilitate circulation in the park.

Rails to Trails Conservancy
1400 Sixteenth Street NW
Suite 300
Washington, D.C. 20036
(202) 797-5400

Connecticut contact: Nancy Boswick
c/o Connecticut Trust for Historic Preservation
940 Whitney Avenue
Hamden, CT 06517
(203) 562-6312

Comments: Local trail advocates have been attempting to create a trail along the old Canal Line railroad from New Haven to Farmington. Development of this resource may require some small bridges.

Other Relevant Agencies and Publications

The following agencies and organizations, some of which have publications, may be useful in disseminating information about candidates for relocation:

Society for Industrial Archeology
Room 5020
National Museum of American History
Smithsonian Institution
Washington, D.C. 20560

Newsletter editor: Robert M. Frame III

Connecticut Trust for Historic Preservation
940 Whitney Avenue
Hamden, CT 06517

Connecticut Preservation News editor: Catherine Lynn
Historic Properties Exchange manager: Christopher Wigren

Connecticut Conference on Municipalities
P.O. Box 1833
New Haven, CT 06508

Connecticut Community Development Association
Community Development Office
50 South Main Street
West Hartford, CT 06107
Attn: Ms. Elain Schmidt

Council of Small Towns
60 Washington Street
Hartford, CT 06106

APPENDIX D

Bridges That Contribute to the Historic Significance of

Merritt Parkway

(65 bridges)

DOT #	TOWN	FEATURE CROSSED	MATERIAL(S)
692	Greenwich	Byram River & Riversville Rd.	concrete
693	Greenwich	Glenville Water Co. channel and road	concrete
694	Greenwich	E. branch, Byram R.	concrete
695	Greenwich	Round Hill Road	concrete
696	Greenwich	Lake Avenue	metal and stone
697	Greenwich	North Avenue	concrete
698	Greenwich	Taconic Road	concrete
699	Greenwich	Stanwich Road	concrete
700	Stamford	Guinea Road	stone
701	Stamford	Mianus River	concrete
702	Stamford	River Bank Road	concrete
703	Stamford	Long Ridge Road (Route 104)	concrete
704	Stamford	Wire Mill Road	concrete
705	Stamford	Rippowam River	stone
706	Stamford	Long Ridge Road (Route 137)	metal and concrete
707	Stamford	Newfield Avenue	concrete
708	New Canaan	Ponus Ridge Road	concrete

709	New Canaan	Route 106	concrete
710	New Canaan	Metro North RR	concrete
711	New Canaan	Lapham Road	concrete
712	New Canaan	South Avenue (Route 124)	concrete
713	New Canaan	White Oak Shade Rd.	concrete
714	New Canaan	Merwin Ridge Road	concrete
715	Norwalk	New Canaan Ave.	metal and concrete
716	Norwalk	Comstock Hill Rd.	concrete
717	Norwalk	Silvermine Ave.	concrete
719	Norwalk	Perry Avenue	concrete
720	Norwalk	Metro North RR	concrete
721	Norwalk	Norwalk River	concrete
530 (A and B)	Norwalk	Main Avenue (old Route 7)	stone
722	Norwalk	West Rocks Road	concrete
723	Norwalk	East Rocks Road	concrete
724	Norwalk	Grumman Avenue	concrete
725	Norwalk	Route 53	concrete
726	Westport	Newtown Turnpike	concrete
727	Westport	Route 33	concrete
728	Westport	Saugatuck River	metal and concrete *
729	Westport	Clinton Avenue	metal and concrete
730	Westport	Weston Avenue	concrete
731	Westport	Easton Avenue (Route 136)	metal and concrete
732	Westport	North Avenue	concrete

733	Westport	Bayberry Lane	concrete
734	Fairfield	Cross Highway	concrete
735	Fairfield	Merwins Lane	metal and concrete
736	Fairfield	Redding Road	concrete
737	Fairfield	Congress Street	concrete
738	Fairfield	Hillside Road	concrete
739	Fairfield	Burr Street	concrete
740	Fairfield	Route 58	concrete
742	Fairfield	Morehouse Highway	concrete
743	Fairfield	Mill River	concrete
745	Trumbull	Park Avenue	concrete
746	Trumbull	Plattsville Rd.	concrete
747	Trumbull	Madison Avenue	concrete
748	Trumbull	Main Street (Route 111)	concrete
749	Trumbull	Frenchtown Road	concrete
750	Trumbull	Reservoir Ave.	concrete
751	Trumbull	Rocky Hill Rd. (former street rwy.)	metal and concrete
752	Trumbull	Pequonnock River	concrete
753	Trumbull	White Plains Rd. (Route 127)	concrete
754	Trumbull	Unity Road	metal and concrete
756	Stratford	Huntington Ave.	concrete
757	Stratford	Cut Spring Road	concrete
759	Stratford	James Farm Rd.	concrete
760	Stratford	Main Steet (River Rd., Rte. 110)	metal and concrete

Bridges That Do Not Contribute to the Historic Significance of Merritt Parkway

(11 bridges)

DOT #	TOWN	FEATURE CROSSED
718	Norwalk	Silvermine River

Reason: built 1958.

741	Fairfield	Cricker Brook

Reason: minor structure (box culvert) with no visual impact on parkway.

744	Fairfield	Route 59

Reason: Previously approved for replacement.

4375	Trumbull	Route 25

Reason: built 1980-81.

4364	Trumbull	Route 25

Reason: built 1980-81.

4363	Trumbull	Route 25

Reason: built 1980-81.

4378	Trumbull	Route 25

Reason: built 1980-81.

5256	Trumbull	Route 8

Reason: built 1983

5257	Trumbull	Route 8

Reason: built 1983

5275	Trumbull	Route 108

Reason: 1983 bridge with minor applied ornament from former bridge on site (#755).

758	Stratford	Pumpkin Ground Brook

Reason: minor structure (box culvert) with no visual impact on parkway.

APPENDIX E

BIBLIOGRAPHY

General

Chamberlain, William P. Historic Bridges - Criteria for Decision Making. Washington, D.C. : Transportation Research Board, 1983.

Delony, Eric. "Bridge Replacement," 11593 (Bulletin of the National Park Service Office of Archeology and Historic Preservation) 2 (October 1977): 9-12.

Historic Highway Bridges in Pennsylvania. Preservation Guide. Harrisburg: Pennsylvania Historical and Museum Commission and Pennsylvania Department of Transportation, 1987.

Jackson, Donald C. Great American Bridges and Dams. Washington, D.C.: Preservation Press, 1988.

Jackson, Donald C. et al. Saving Historic Bridges. Washington, D.C.: National Trust for Historic Preservation, Information Sheet Number 36, 1984.

Stone:

Blades, Keith, Gail Sussmann and Martin Weaver (edss). Masonry Conservation and Cleaning Handbook. Ottawa: Association for Preservation Technology and Heritage Canada, 1984. Reprints of technical articles from various sources, most on brick masonry.

Conservation of Historic Stone Buildings and Monuments. Washington, D.C.: National Research Council (National Academy Press), 1982. Anthology of articles.

London, Mark. Masonry: How to Care for Old and Historic Brick and Stone. Washington, D.C.: National Trust for Historic Preservation, 1988.

Trusses:

"Shore-Berthed Bridge Gets Rehab Treatment," Engineering News-Record, May 12, 1983, 26-27. [2nd Street Bridge, Allegan, Michigan].

Spero, Paula A.C. Trial Guidelines for the Conservation of Virginia's Historic Bridges. Charlottesville: Virginia Transportation Research Council, 1986.

Zuk, William, Howard Newlon, Jr., and Wallace T. McKeel, Jr. Methods of Modifying Historic Bridges for Contemporary Use. Charlottesville: Virginia Highway and Transportation Research Council, 1980.

Concrete:

Coney, William B. Preservation of Historic Concrete: Problems and General Approaches. Washington, D.C.: National Park Service, Preservation Brief No. 15, [c. 1986].

Coney, William B., and Barbara M. Posadas. Concrete in Illinois: Its History and Preservation. Springfield: Illinois Historic Preservation Agency, 1987. Pamphlet.

Pfeifer, D. W., and M. J. Scali. Concrete Sealers for Protection of Bridge Structures. Washington, D.C.: Transportation Research Board, National Cooperative Highway Research Program Report No. 244, 1981.

Sabnis, Gajanen. (ed.). Rehabilitation, Renovation and Preservation of Concrete and Masonry Structures. Detroit: American Concrete Institute, Publication ACI-SP-85, 1985. Most of the articles in this volume are not about historic preservation projects, but much of the technical information is relevant.