

**MOBILITY IMPROVEMENT STUDY  
FOR THE VILLAGE OF EAST HADDAM  
CONCEPT DESIGN PHASE**

**East Haddam, Connecticut**

**July 9, 2004**

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## 1.0 EXECUTIVE SUMMARY

Fuss & O'Neill, Inc. (F&O) has been retained by the Town of East Haddam to undertake a Mobility Improvement Study for the Village of East Haddam. The project is being administered by the Connecticut Department of Transportation (Project #40-129). The project is funded through a Federal Grant which resulted from an application made by the Town of East Haddam, with cooperation and support from Goodspeed Musicals.

The project area, located along the Connecticut River, is in East Haddam, Connecticut. Project limits are centered in East Haddam Village and extend north to Nathan Hale School, northeast to Ray Hill Road, east to Creamery Road, south to the northern portion of the Goodspeed Airport, and west to the Tylerville section of Haddam. The project area includes state and federally regulated wetland areas, floodplains, and historically and archeologically sensitive areas.

The goal of this project was to develop a village concept plan that improves vehicular and pedestrian mobility and safety, identify potential areas for development with associated parking and streetscape enhancement, and still maintain the historic and scenic character of the village.

The recommended concept plan reflects inputs from the state, town and community and is as close to a consensus plan that may be possible in the public environment at this time. More detailed design of the plan elements must be completed in future phases of the project and presented to the public for additional input and refinement.

The two development scenarios considered were:

- Mixed Use Development of Village Area
- Goodspeed Expansion (New Theater) Within the Village

An integral part of the Concept Phase of this project was a public participation program with two major purposes. First, the public participation program was intended to gather information concerning the desires, goals, likes, and dislikes of the community as a whole, as they relate to the project area. The second, and equally important, purpose of the public participation program was to involve the public in the planning process and move toward consensus in a common vision and set of goals.

Several previous plans have been developed, mostly aimed at the proposed expansion of the Goodspeed Musicals by the addition of a second theater. Since this was one of the two development scenarios being evaluated in this project, the previous plans were reviewed and considered by the design team.

The provision of traffic calming measures was identified as one of the primary goals of this project and was highlighted as critical by the "Vision for East Haddam Village", and their "Guiding Principles". Traffic calming was considered by the project Steering Committee to be a very important element of this mobility project.

A variety of traffic calming measures were considered during the preliminary concept layouts in conjunction with the highway design, pedestrian accessibility, and site development objectives for the project.

The study concludes that improvements are needed in several locations to address the safety and mobility concerns. These measures include:

- A new traffic control signal at the Route 82/Route 154 (southerly) intersection, in Haddam.
- Modification of the traffic control signal and roadway at the Route 82/Route 154 (northerly) intersection, in Haddam
- Widen Route 82 to straighten the alignment and minimize the horizontal curve east of the Swing Bridge to improve vehicular and pedestrian safety.
- Modify the roadway geometry of Route 82 in the area of the Goodspeed and Town Office Section of East Haddam Village
- Realign Lumberyard road intersection, roadway and crossing of the Succor Brook.
- Minor modifications to approaches and signage at the intersection of Route 82 and Route 149 in East Haddam Village.
- Traffic calming measures within the on approach routes to the Village Area.

The design team considered potential development sites as those sites that could support development through:

- Re-development, including:
  - Property containing the town offices and parking
  - Former Williams Chevrolet property
  - Goodspeed parking west of Lumberyard Road
- New development of building and/or parking, including:
  - Goodspeed property north of Creamery Road
- New development of parking, including:
  - Goodspeed property south of Creamery Road

The parking needs of the two development scenarios are not very different since both plans are based on development/redevelopment of the same areas. The main difference is a phased plan could be implemented in an “as-needed” basis with the mixed use alternative.

Both the mixed use and new theater development plans would require or need approximately 590 to 600 parking spaces available. For a planning level study, such as this one, the potential parking appears sufficient based on the needs calculated above. It should be noted that the alternative parking garage structure could take the place of the parking south of Creamery Road and provide essentially the same net parking spaces.

Remote parking opportunities were considered for both development scenarios. The largest potential opportunity for remote (off-site) parking is the large parking area previously used by Camelot Cruises on the Haddam side of the river. However, this parking was not considered a feasible option for a variety of reasons.

The pedestrian access within, as well as to and from the Village Area, is proposed to be of two types. There will be “formal” sidewalk areas which are primarily proposed along existing roadways along the main thoroughfares, and “informal” walking areas in more natural settings.

In general the study indicates that mobility improvements are available that satisfy the long range development scenarios considered during the study process. In addition, parking concerns can be adequately addressed through full build out under either development scenario considered with subsequent Town policy change and regulatory support.

The balance between various factors of consideration and evaluation criteria must be further developed as the design progresses in future phases of the project. Most notably, questions concerning the balance between wetland impacts (approximately 2.5 acres of disturbance) related to the proposed Creamery Road Parking Lot versus the cost, operational, and aesthetic concerns of the potential multiple level parking structure on the Town Office site must be resolved.

The design team was unable to address some of the concerns of the stakeholders. Two of the most significant items that were not resolved are the pick-up of patrons in front of the existing Goodspeed Theater, and the use of “small, dispersed, interconnected” parking areas to provide the required additional parking.

The recommended plans would have potential impacts on wetlands, areas of moderate to high sensitivity to both prehistoric Native American archaeology sites and 18-19<sup>th</sup> century historic archaeology sites, historical sites and structures, and rights of way.

The “conclusion” of this phase of the project is really the beginning of the design phase and, therefore, does not represent a “final” plan. The Stakeholders must now use the information contained in this report to decide if and how to proceed with future design phases.

The Town must identify funding sources and then select and prioritize improvements that can be designed and built within the available funding. Enabling zoning regulations may have to be developed and approved to support and allow the development alternatives chosen by the Town.

## 2.0 INTRODUCTION

### 2.1 General

Fuss & O'Neill, Inc. (F&O) has been retained by the Town of East Haddam to undertake a Mobility Improvement Study for the Village of East Haddam. The project is being administered by the Connecticut Department of Transportation (Project #40-129). The project is funded through a Federal Grant which resulted from an application made by the Town of East Haddam, with cooperation and support from Goodspeed Musicals.

### 2.2 The Design Team

The design team consisted of:

- Fuss & O'Neill, Inc. – Lead consultant and engineers
- The Newport Collaborative Architects, Inc.– planning consultants
- Traffic Data Solutions – traffic and parking data collection
- Golden Aerials – aerial mapping of the project area
- New England Soil Science – wetland delineation
- Penny Sharp – biologist, function and value assessment of wetland areas
- Fitzgerald and Halliday – website creation and maintenance

### 2.3 Project Purpose

The project was undertaken by the Town to improve mobility and safety within the Village for both pedestrian and vehicular traffic. Our work included identification and analysis of existing deficiencies such as vehicle speeds, sight lines, roadway geometry, and pedestrian access throughout the project limits including several miles of state and local roads. Various improvement alternatives were evaluated to address these deficiencies.

Key objectives of the project included addressing existing conditions such as pedestrian connections in the Village, roadway geometry from the swing bridge to Route 149, and sight lines from Lumberyard Road looking along Route 82. Since the transition between vehicle trips arriving in the village and pedestrians walking in the village occurs in parking lots, it was recognized that parking considerations would have to be integrated into this mobility improvements project.

In addition to the existing issues, both real and perceived, the project was intended to address mitigation of potential impacts caused by further development of the Village Area. As further described later in this report, there were two scenarios for development that were to be considered. Under both scenarios, the intent was to determine the build out potential of the Village Area and develop strategies and methods of improving mobility and safety for pedestrians and vehicles.

## 2.4 Goal of the Concept Design Phase

The purpose and intent of the concept design phase was to define the scope of improvements for the categories of work described in the project scope and extents described below. The goal of this project was to develop a village concept plan that improves vehicular and pedestrian mobility and safety, identify potential areas for development with associated parking and streetscape enhancement, and still maintain the historic and scenic character of the village. The recommended concept plan reflects inputs from the state, town and community and is as close to a consensus plan that may be possible in the public environment at this time. More detailed design of the plan elements must be completed in future phases of the project and presented to the public for additional input and refinement.

Alternatives were evaluated on a conceptual basis only, with engineering and design as needed to assess the feasibility of the concepts. The level of detail for the analysis of options and their related opportunities and constraints were based on the need to present the reasonable options in a public forum as concepts for consideration by the State, Town and community.

Opportunities and constraints related to the available options were discussed during the study to allow the State, Town and community (collectively known as the Stakeholders) to make informed decisions in building a consensus to address long term Town goals and to better capture the distinctive opportunities of the Village including:

- Connecticut River
- Village Charm
- Historic Elements
- Nathan Hale
- Goodspeed Opera House and Gelston House

The conclusion of this phase of the project is really the beginning of the design phase and, therefore, does not represent a “final” plan. The Stakeholders must now use the information contained in this report to decide if and how to proceed with future design phases.

## 2.5 Project Scope and Extents

The full scope and extents of the project are defined in the “EAST HADDAM MOBILITY STUDY – Concept Design Scope” ([Appendix A](#)).

The geographic extents of the main focus area of the project (commonly referred to as the East Haddam Village) were as follows:

- Bounded on the north by Route 82 and Creamery Road
- Bounded on the east by Creamery Road
- Bounded on the south by Lumberyard Road and East Haddam Airport
- Bounded on the west by the Connecticut River

Because connections to the surrounding areas must be considered in mobility improvements projects of this type, the geographic extents also included:

- Potential river walk west of the Town office complex and adjacent to the Connecticut River to connect the Nathan Hale School house. Area bounded on the south by Route 82, bounded on the east by Route 149, on the north by the Town office complex and the Nathan Hale School house and on the west by the Connecticut River.
- Route 82 north from the Route 149 intersection approximately 1,500 feet to a point approximately 100 feet north of Ray Hill Road. Limits were approximately 20' beyond the edge of roadway or to face of building, whichever was closer.
- Route 149 north from the Route 82 intersection approximately 4,000 feet to Landing Hill Road. Limits were approximately 20' beyond the edge of roadway or to face of building, whichever was closer.
- Route 82 (Bridge Road) at Route 154 (Middlesex Turnpike) Intersection in Haddam.
- Route 82 (Route 9 Connector) at Route 154 and 82 (Middlesex Turnpike) Intersection in Haddam.

The geographic extents were surveyed using a combination of aerial mapping and field survey, as well as research of land records for boundary and ownership issues. The results are graphically depicted in the base mapping prepared for the project ([Appendix B](#)).

In addition to the desire to improve safety and mobility, there were two major development scenarios studied in this project. Both included "mixed use" development which is a combination of residential, retail, and commercial development, and preferably multiple types of residential development, rather than a monoculture.

Mixed use development was common in historic New England downtown and village center areas, but has been replaced in many communities by land use zoning which discourages multiple uses in any one part of a community, or even in the same building. Fortunately, East Haddam allows mixed use in its existing zoning regulations and the Village Area has retained its historic and functional mixed-use character. The stated intent of the Town in either development option was to further develop the mixed use aspects of the downtown to create a vibrant and economically robust area.

The two development scenarios considered were:

- Mixed Use Development of Village Area which included:
  - Historic Theater
  - Mixed Use Development within the Village Area
- Goodspeed Expansion Within the Village
  - Historic Theater
  - New 700 Seat Theater
  - Mixed Use Development/Re-development within the Village Area

## 2.6 Public Participation Program

An integral part of the Concept Phase of this project was a public participation program with two major purposes. First, the public participation program was intended to gather information concerning the desires, goal, likes, and dislikes of the community as a whole, as they relate to the project area.

The second, and equally important, purpose of the public participation program was to involve the public in the planning process and move toward consensus in a common vision and set of goals. This facet of the program required both presentation of findings and recommendations, and further gathering of information concerning levels of acceptance. This is an iterative process which will continue through future design phases and opportunities to respond to public comment.

Not all goals and desires, no matter how popular, can be achieved within the physical, fiscal, or regulatory constraints that exist. Therefore, it is important at times to explain the reasons certain goals cannot be met and provide alternatives that may at least partially address the underlying concern. The public participation program is an important tool in promoting understanding of the constraints as well as the goals of the project.

In order to balance the need to reach a broad segment of the Town while still having meaningful and detailed discussions, the public participation program was divided into several groups (known as stakeholders), as follows:

- The Steering Committee: Representative stakeholders primarily from the Village Area, including the Town Planner, First Selectman, Connecticut Department of Transportation, Goodspeed Musicals, the Village Planning Group, and the design team. In addition, the Inland Wetlands Commission, Board of Finance, and other Selectmen, occasionally joined these meeting.
- Focus Groups: There were three primary focus groups:
  - Regulatory Agencies
  - Non-Regulatory Agencies
  - Goodspeed Musicals
- Public Meetings: Open to all citizens of East Haddam, as well as Haddam and other interested individuals. Public meetings were advertised in a variety of ways, including website notices, press releases, and even direct mailings.
- Website: Throughout the concept phase of the project, a website was maintained and contained meeting schedules, project information and status, and a location to make comments and suggestions to the design team.

It should be noted that although the groups met at different times, all meetings were open to the public. The goal was not to preclude people from participation, but rather to focus discussions in order to make the meetings as efficient and beneficial, as possible.

Two rounds of meetings were held for the Focus Groups and Public Meetings. The first round focused on information gathering and was held in December 2003. The second round presented findings and sought feedback and future guidance. The second round was held in March 2004.

The Steering Committee met on several occasions, before, between, and during both rounds of Focus Group and Public Meetings.

Minutes of the meetings and comments gathered from the Public Meetings and from the web site are attached in Appendix C.

### **3.0 BACKGROUND INFORMATION AND DATA GATHERING**

#### **3.1 Background Information**

The project area, located along the Connecticut River, is in East Haddam, Connecticut. Project limits are centered in East Haddam Village and extend north to Nathan Hale School, northeast to Ray Hill Road, east to Creamery Road, south to the northern portion of the Goodspeed Airport, and west to the Tylerville section of Haddam.

The majority of the project area is located in a Commercial (C-1) Zoning District, according to the Town of East Haddam Zoning Map. Smaller portions of the site are located in a Residential (R-1) and Lake and Riverfront (LR) Districts. Additionally, the Lower Connecticut River Conservation Overlay Zone applies between the Connecticut River and the ridge just to the east of Creamery and Norwich Roads.

The Town has stated that sufficient capacity exists in the wastewater treatment facility to allow sewer service for either development option. No further analysis, or confirmation of this the assumption, were completed by the design team.

A portion of the project area, adjacent to the Goodspeed Opera House, lies within the East Haddam National Register Historic District and the local East Haddam Historic District. This area consists of 18<sup>th</sup> and 19<sup>th</sup> century residential and commercial buildings. Additionally, the Swing Bridge and the Goodspeed Opera House are State recognized historic structures. The area along Route 82, west of the Swing Bridge and north of Route 154, as well as the Swing Bridge itself, are not currently listed on the National Register of Historic Places, but meets the eligibility criteria for listing; therefore the area should be treated as a historic area.

#### **3.2 Data Gathering**

An important part of this project was the gathering of data to use in the evaluation of alternatives. Data was gathered prior to any planning or design work to ensure that there would be no bias in the collection or analysis of data. For similar reasons, analysis of data was delayed until the completion of the first round of public input meetings to ensure that public discussions were not influenced by opinions that the designers may have formed by reviewing the data.

In many facets of the project, previous studies had been conducted. The information available from the prior studies was reviewed and considered in the project. However, new data was gathered in most cases to confirm the accuracy of the data and to make sure there were no changes since the time of the previous studies.

### 3.3 A Vision for East Haddam Village

Prior to this project beginning, several community groups worked together to prepare a document entitled, “A Vision for East Haddam Village”. This document provides a framework of concepts and goals for these groups and provided valuable insight and guidance to the design team. A copy is attached in Appendix D.

The organizations which participated in the preparation of this document (authors) included:

- East Haddam Village Planning Group
- East Haddam Village Merchants
- East Haddam Economic Development Commission
- Goodspeed Musicals

The vision described in the document is to maintain and restore the historical character of the Village, which is much attributed to its location on the Connecticut River. In the 1600's, East Haddam was a major center for commerce. However, over the past century the Village center has lost some of its character due to a decline of ship based industry. It is the stated desire of the authors to restore the historical aspects of East Haddam Village while promoting tourism and business by developments that compliment the Town's existing historical character.

The authors have developed six (6) project guidelines to ensure the development will enhance and restore the character of East Haddam Village, while improving many existing issues.

- Aesthetics – East Haddam Village is a nationally recognized historical district with multiple historical structures. The authors envision both proposed buildings that blend with existing buildings, and the restoration of existing buildings.
- Economic Development – The authors believe that in order for the Village to be vibrant and viable, there must be a mixture of residential, commercial, public, and private developments.
- Roadway and Traffic Flow – Not only do the existing roads, including the East Haddam Swing Bridge, suffer from heavy traffic volumes, but the layout of the roads fragment the community. The authors strongly support the use of traffic calming measures to slow traffic through the Village. Additionally, pedestrian safety and access to the Village is an issue, therefore, the authors support the development of improved and expanded sidewalks and crosswalks.
- Parking – Currently, there is not an adequate amount of parking to allow an increased number of tourists. The authors support additional parking, designed as small, dispersed, interconnected areas, is necessary for the Village to be commercially viable.
- Natural Resources – East Haddam Village offers access to unique features along the Connecticut River Valley. The authors desire the development of the Village to provide easy access to these areas for pedestrians while maintaining the integrity of the natural resources.

- Community Involvement – The authors desire to achieve a development plan that reflects the wants and needs of all aspects of the community.

### 3.4 Previous Development Concepts

Several previous plans have been developed, mostly aimed at the proposed expansion of the Goodspeed Musicals by the addition of a second theater. Since this was one of the two development scenarios being evaluated in this project, the previous plans were reviewed and considered by the design team. Of greatest interest, was the plan prepared by Close, Jensen, & Miller (CJM) which is attached as Appendix E.

The purpose of this plan was for the expansion of the Goodspeed Opera House. Since this plan was developed, the purpose of development in East Haddam has changed to consider not just expanding the Goodspeed Opera House, but to also include the broader goal of developing the mixed-use vitality of East Haddam Village.

The conceptual layout in the CJM plan included the development area and two new parking areas. The first parking lot was proposed in Lot 56 and 57, north of Succor Brook and southeast of the Creamery Road Route 82 intersection. This lot, approximately 172,000± s.f. in size, had a parking capacity of 221 vehicles. The second parking lot, located east of the Connecticut River and West of Lumberyard Road, was an expansion and redesign of an existing parking lot. This parking lot would result in the addition of 49 parking spaces.

The CJM layout included the realignment of Lumberyard Road. Currently, Lumberyard Road crosses Succor Brook and continues north with out any horizontal curves. The CJM plan proposed that Lumberyard Road cross Succor Brook and then curve to east, abutting Parking Lot 1, and then curve back to the west to intersect Route 82 close to the existing Lumberyard Road and Route 82 intersection. The new Goodspeed Opera House building was proposed to be located east of the existing Lumberyard Road and west of the proposed Lumberyard Road.

A paved pedestrian and bicycle trail, weaving around the existing and proposed opera house, across Succor Brook, along the Connecticut River, to both of the proposed parking areas, and east through the wetland area, was also proposed as part of the CJM plan. The path was to be heavily landscaped with scenic overlooks located along the path. This path would involve the construction of a pedestrian bridge across Succor Brook. The plan also proposed sidewalks and landscaping to be placed along Route 82, starting at the Lumberyard Road intersection and continuing north to the Nathan Hale School.

### 3.5 Existing Roadway System

#### 3.5.1 Traffic Data Collection

1. Automatic Traffic Recorders (ATR) counts were conducted in August 2003 over a continuous count period beginning Tuesday through Sunday. Bi-directional count

data was collected at 17 locations as shown in the table in [Appendix F](#) to identify existing traffic volumes and vehicle speeds within the project limits.

2. Intersection turning movement counts were conducted in August and October of 2003 on a weekday from 7 to 9 AM and 4 to 7:30 PM, and on a Sunday from 3 to 8:30 PM for the following four intersections:

- Route 82 at Route 154
- Route 82/154 at Route 9 Connector
- Route 82 at Lumberyard Road
- Route 82 at Creamery Road

Based on the recent traffic counts, the Connecticut Department of Transportation Bureau of Planning projected traffic volumes for the following conditions:

- 2005 Background
- 2005 with a 700 seat expansion to the Goodspeed Opera House
- 2025 Background
- 2025 with a 700 seat expansion to the Goodspeed Opera House.

Traffic volume figures #1 - #15 depict the anticipated traffic volumes under each of these conditions and are provided in [Appendix F](#).

3. Accident data was gathered from the Department of Transportation (ConnDOT) for the intersections and roadways in the study area. The records were gathered for the most recent 3 years of available data, 1999 through 2002. A summary of the accident data is provided in [Appendix F](#). The accident summaries indicate that there is no apparent problem with these intersections.

### 3.5.2 Roads

#### Route 82

Route 82 within the project limits for the Mobility Study extend west to east from the terminus of the high speed Route 9 connector in Haddam across the Connecticut River and through the Village of East Haddam to the intersection with Ray Hill Road. Route 82 bisects the Village, separating the large parcels owned by the Town of East Haddam from the Goodspeed Opera House facilities. A segment of Route 82 in the village is designated as a scenic roadway.

The Route 82 Swing Bridge provides vehicular access across the Connecticut River. The bridge opens for boat traffic every half hour from 9:00AM to 9:00PM from May through October and is opened as needed during the rest of the year. Traffic signals are provided at the bridge approaches to stop traffic during bridge operations. It takes approximately 15 minutes for the Swing Bridge to open and close. During this 15 minute period, vehicular traffic is stopped on both sides of the Connecticut River. Vehicle delays and queues are

extensive on both sides of the river during this period. A sharp horizontal curve is present on Route 82 immediately east of the Swing Bridge. Tractor trailers and other large vehicles have difficulty negotiating this curve, particularly if a queue of vehicles is waiting to cross the bridge.

Route 82 is classified as a rural minor arterial and typically provides one lane in each direction with narrow striped shoulders and has a posted speed limit of 25 miles per hour (mph). The roadway services traffic volumes of approximately 10,000 vehicles per day, and existing vehicle speeds vary greatly within the project limits. Speeds along Route 82 westbound approaching the Village were observed to be excessive. Specific traffic volume and speed data by segment is provided in more detail in a table later in this report.

#### Route 154

Route 154 travels north and south through the Town of Haddam within the project limits extending from south of the Route 82/Route 9 connector to north of the Route 82 intersection at the traffic signal. Route 154 in Haddam is designated as a scenic roadway. Route 154 overlaps with Route 82 for a 0.6 mile segment and is classified as a rural major collector to the north and south of the overlap, and as a rural minor arterial within the overlap segment. The roadway provides a single lane with narrow shoulders in each direction and has a posted speed limit of 45 mph within the study area. The roadway services traffic volumes of approximately 11,325 vehicles per day, and existing vehicle speeds average 50 mph. Specific traffic volume and speed data by segment is provided in more detail in a table later in this report.

#### Route 149

Route 149, which is designated as a scenic road, travels north and south paralleling the Connecticut River and providing access from East Haddam to Moodus and northeast to Route 2. The study limits along Route 149 begin in the south at the intersection with Route 82 in the Village of East Haddam and extend to the north to Landing Hill Road. Properties abutting Route 149 are primarily residential with a mix of other developments such as the post office, Nathan Hale School, and a bank.

Route 149 is classified as a rural major collector and provides a single travel lane with narrow shoulders in each direction and has a posted speed limit of 30 mph within the Village. The speed limit changes to 35 mph approximately 1,000 feet south of Landing Hill Road. The roadway services traffic volumes of approximately 4,000 vehicles per day, and existing vehicle speeds vary greatly within the project limits. Speeds along Route 149 northbound and southbound from Landing Hill Road south to the Village were observed to be in excess of the posted speed limit. Specific traffic volume and speed data by segment is provided in more detail in a table later in this report.

#### Local Roads

Lumberyard Road is a two lane local road providing a short connection from Route 82 to Creamery Road. Access to the Gelston House Restaurant, and the Goodspeed Opera House

are provided from this roadway. Traffic volumes average approximately 500 vehicles per day on weekdays and Saturday, and 1,000 vehicles per day on Sunday.

Creamery Road is a two lane local roadway beginning at Route 82 and terminating at the Goodspeed Airport and Seaplane base. Properties abutting this roadway are primarily residential, and traffic volumes average 100 vehicles per day.

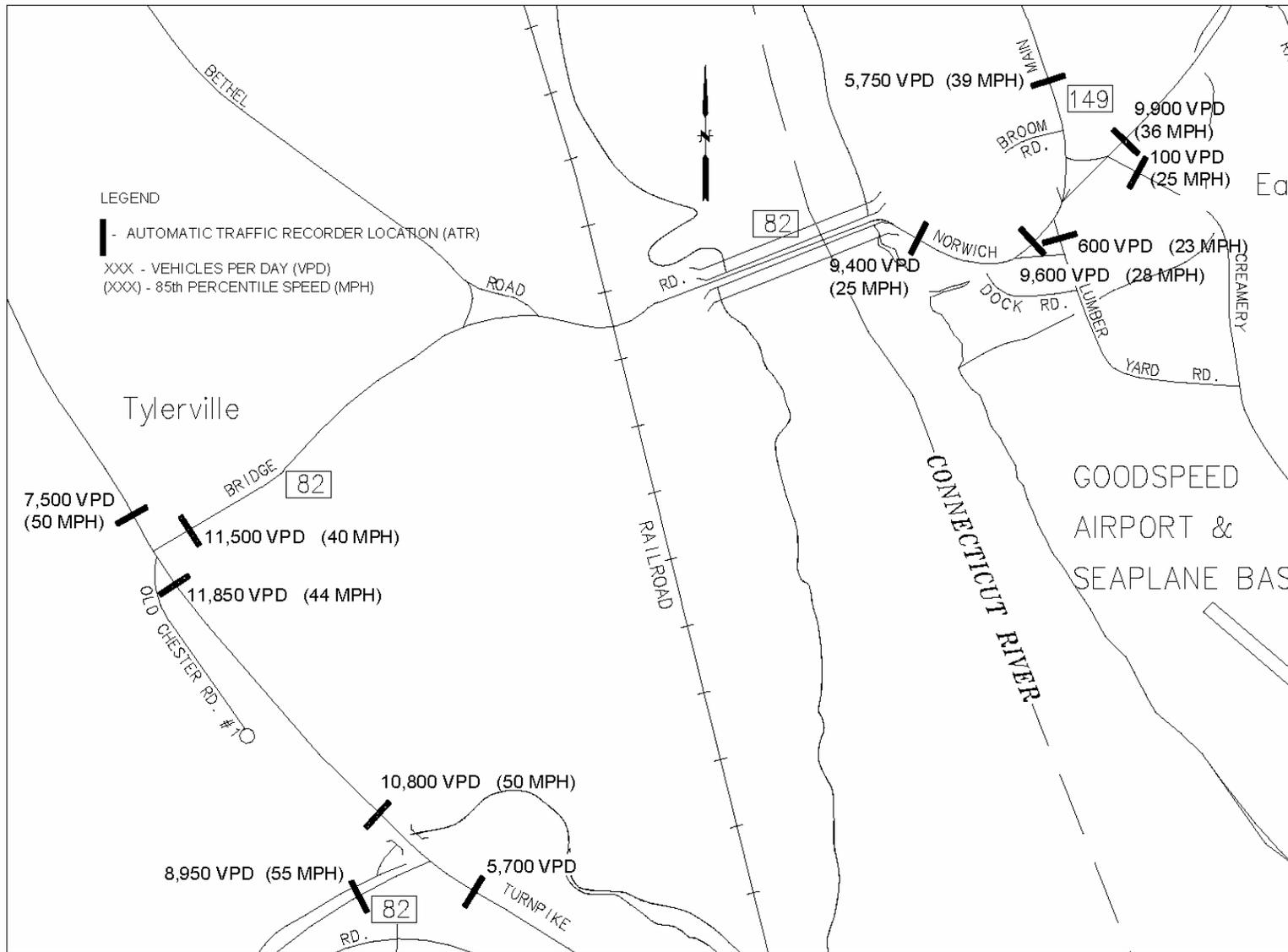
**Daily Traffic and Speeds by Segment**

Town	Road Segment	Volume* (Vehicles per day)	Speed* (85%ile)
<b>Haddam</b>			
<b>Route 82</b>	West of Route 154	8,950	55
	North of Connector (overlaps Rte 154)	10,800	50
	South of northerly Rte 154 intersection (overlaps Rte 154)	11,850	44
	East of Route 154	11,500	40
<b>Route 154</b>	South of Route 82 overlap	5,700	-
	North of Route 82 overlap	7,500	50
<b>East Haddam</b>			
<b>Route 82</b>	East of Swing Bridge	9,400	25
	At Lumberyard Road	9,600	28
	At Route 149	11,150	-
	West of Creamery Road	6,200	30
	East of Creamery Road	9,900	36
<b>Lumberyard Rd</b>	South of Rt. 82	600	23
<b>Creamery Rd</b>	South of Rt. 82	100	25
<b>Route 149</b>	North of Rt. 82	5,750	39

\* Volume and Speed information taken from ATR data as discussed in the Data Gathering Section of this report. The proposed conditions are presented in Section 4.1.5 Capacity Analysis and in Appendix F.

3.5.3 Intersections

1. Route 82 at Route 154 (southerly): The Route 82 high speed connection to/from Route 9 intersects with Route 154 at a “T” intersection with flashing beacon in the Town of Haddam. All three legs of the intersection provide single lane approaches, and a stop sign is present on the Route 82 eastbound approach to Route 154. Grades are flat in the vicinity of the intersection, and sight lines are sufficient from Route 82 looking to the north and south along Route 154. Route 82 overlaps with Route 154 for approximately half a mile to the north of this intersection.
2. Route 82 at Route 154 (northerly): The northerly junction with Route 154 is a “T” intersection with traffic signal control. Development at the intersection includes a gas station in the northeast corner, and a retail and commercial plaza in the southeast corner. Route 82/154 approach from the south providing a single 13 foot wide lane, and Route 154 continues to the north, while Route 82 turns 90 degrees to head east



VOLUME AND SPEED DATA



3. toward the Connecticut River. The Route 154 southbound approach provides a single twelve foot wide lane, and the Route 82 westbound approach provides a single twelve foot lane.

Traffic congestion and vehicle queues are prevalent at this intersection during the periods when the Swing Bridge at the Connecticut River is open for boats. Northbound and southbound through traffic are blocked by the eastbound queue on Route 82 waiting for the bridge. The resulting queues on Route 82 and Route 154 extend thousands of feet to the north and south of this intersection during the bridge operations.

4. Route 82 at Lumberyard Road: Lumberyard Road intersects Route 82 at a 3 way "Y" configured intersection east of the Goodspeed Opera House. The Lumberyard Road approach to this intersection is a single lane and is STOP controlled. A landscaped island splits Lumberyard Road creating two approach legs to Route 82. The eastern leg allows right turns from Lumberyard Road and left turns from Route 82 onto Lumberyard Road. The western leg allows vehicles right turns from Route 82 onto Lumberyard Road left turns from Lumberyard Road.

Route 82 proceeds westbound through the intersection on a relatively flat approach, and begins a slight uphill climb to the east of the intersection. A sharp horizontal curve is present on Route 82 at this intersection which greatly impedes stopping sight distance for westbound traffic. Driveways to the Town office complex, the Gelston House Restaurant, and the Goodspeed Opera House are present in the vicinity of this intersection.

Pedestrians frequently cross Route 82 from parking lots at the town complex to the Gelston House or the Goodspeed Opera House at the existing crosswalk. The impaired sight distance for westbound traffic creates a potential conflict with these pedestrians, and results in a perception that these vehicles are traveling too fast through the village. The sharp curve and impaired sight distance are noted as deficiencies to be addressed. A second crosswalk is provided across Route 82 east of Lumberyard Road. A sidewalk is present on the north side of Route 82 from 100 feet east of the bridge to Lumberyard Road. Sidewalks are provided along both sides of Route 82 beginning at Lumberyard Road and extending to the east.

The pavement width of Route 82 west of the intersection widens greatly to connect with Gelston House parking, and is delineated by short "cat track" white pavement markings indicating the edge line of Route 82 for through traffic. This widened segment of Route 82 overlaps with the Lumberyard Road westerly leg, provides an undefined edge of Road for Route 82, creates a much longer crossing for pedestrians, and induces confusion for traffic maneuvering in and out of parking or making the left turn exiting Lumberyard Road

5. Route 82 at Route 149: Route 149 intersects Route 82 at a skew angle "Y" type intersection approximately 200 feet east of Lumberyard Road. Southbound Route 149 approaches Route 82 providing a single lane on a steep to moderate down

sloping grade and has a stop sign at Route 82. Route 82 provides a single lane in each direction and proceeds through the intersection on a long vertical curve which peaks at Route 149. Westbound Route 82 has a stop sign at Route 149, however, eastbound Route 82 does not have a stop sign.

Traffic signs for way finding and route markers are provided on all approaches to this intersection, however, drivers unfamiliar with the area typically slow down to navigate the intersection. Sight lines at the intersection are generally good, although the skew angle forces westbound drivers to turn their head sharply to look north along Route 149.

Westbound traffic which wants to head north along Route 149 has an opportunity to turn right onto Route 149 at Creamery Road located 120 feet east of this intersection. Signs indicating "Do Not Block Intersection" are present on Route 82 westbound to deter gridlock traffic conditions during the swing bridge operations. Sidewalks are provided along both sides of Route 82, and the west side of Route 149 at the intersection.

6. Route 82 at Creamery Road: Creamery Road intersects Route 82 at a four way intersection east of Route 149. All four legs are single lane approaches, and stop signs are present of both Creamery Road approaches. Grades along Route 82 are generally flat, while Creamery Road slopes steeply downward from through the intersection down to the southeast. The Creamery Road steep approach to Route 82 results in restricted sight lines looking to the east on Route 82.

Residential Driveways are present near the intersection, and a drive and parking area for a package store are located just east of the intersection. Route 82 traverses Succor Brook to the east of this intersection, and a sidewalk is provided along the southeast side of Route 82 from the brook continuing to the east.

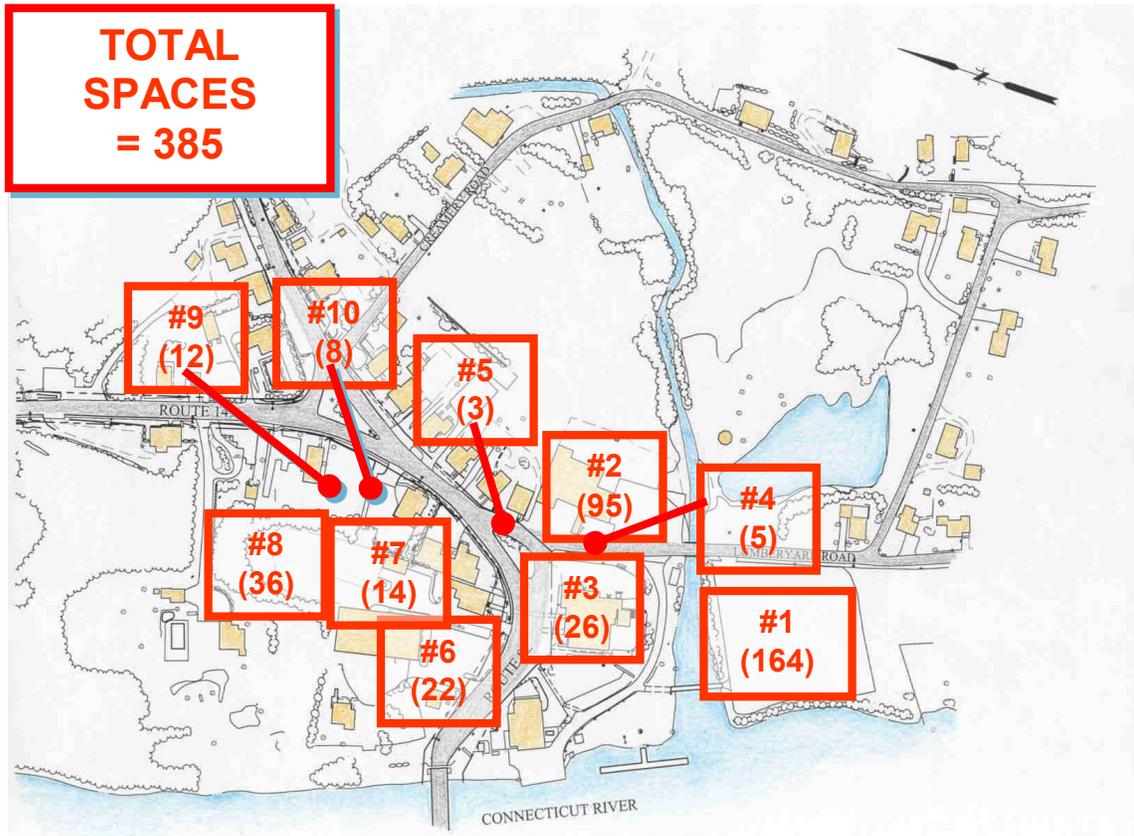
### 3.6 Existing Parking

F&O personnel conducted a parking lot occupancy survey during a typical weekday and Sunday to establish the baseline demand for parking at the Town lots on the north side of Route 82, the restaurant parking lot, and the existing Opera House parking lot when the Opera House was not performing a show. This study was conducted in February 2004 during a period from 1PM – 5PM, and from 6:30PM to 10:30 PM to establish the maximum Town office and local business related parking demand.

A copy of the parking lot counts is attached in Appendix G.

In general, the counts indicate that there are approximately 385 parking spaces within the study area. Of these spaces, only about 70 are needed to support the existing mixed use development within the Village Area. It should be noted that these numbers exclude some spaces which are used for specific building and are, therefore, not available to be considered for shared parking and would presumably have the same use after development, as before.

The following figure depicts the location and approximate size of the parking that exists in the study area as of January of 2004:



The parking lots are numbered as follows:

1. Main Opera House parking lot
2. Commercial parking lot
3. Gelston House Restaurant parking lot
4. Lumberyard Road On-Street parking
5. Goodspeed Opera House Island on street parking
- 6 -10. Various Town Commercial parking lots

The study was conducted during a time that the Goodspeed was not in operation so that the parking needs for other uses could be identified. The study results indicate that Lots 1 and 2 were not used at all. These lots contain approximately 250 parking spaces.

Lots 3, 4, and 5 were used between 6:30-10:30 PM on Saturday for restaurant (Gelston House) parking. Lot 6 also was in use during this time, however, it should be noted that Lot 6 was never more than half full.

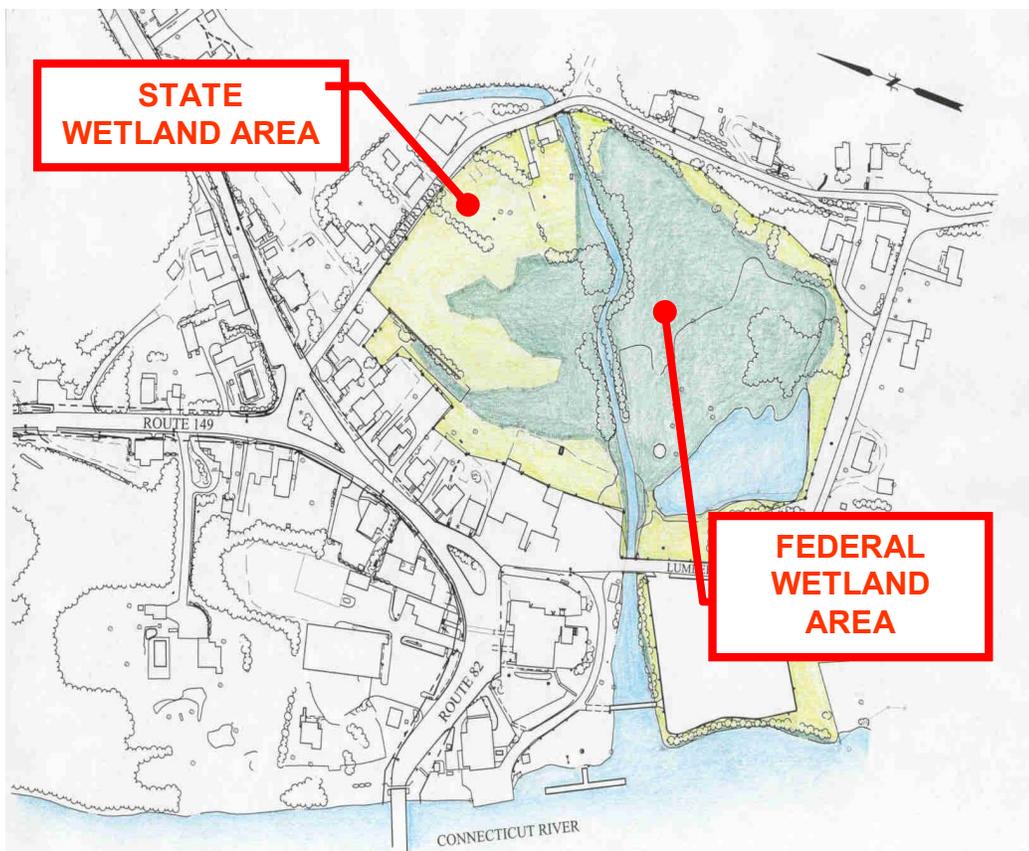
Lots 6 through 10 were never full during weekday or weekend performance times, and were actually less than 30% full during those times. This indicates that shared parking concepts could be used since the parking needs do not seem to overlap.

### 3.7 Existing Regulated Wetlands Areas

The regulated wetlands in the project area were field delineated by a professional soil scientist, Rich Snarski, of New England Soil Science. The delineations were divided into federally regulated wetland areas and state regulated wetland areas. The delineations were field located by survey and depicted in the base mapping prepared for the project.

Penelope Sharp, a wetland biologist, prepared a functional assessment of the wetlands and prepared a report of her findings. A copy of this report is in Appendix H, and is summarized below:

The purpose of the investigation was to examine the wetlands on the property and to provide a functional analysis of the wetland resources at the site. The survey was conducted on foot, and observations were made while walking randomly throughout the wetlands. Data collected included an inventory of vegetation species, an inventory of species of wildlife directly observed, species of wildlife detected by call or song, and evidence of wildlife use such as nests, tree cavities, burrows, tracks, scat, or other signs. The study area borders the Connecticut River and Succor Brook, both functionally diverse wetland resources.



Site plan maps, Connecticut Department of Environmental Protection Bulletin No. 4, *Atlas of the Public Water Supply Sources and Drainage Basins of Connecticut*, and the United States Geological Survey topographical map, Deep River Quadrangle, were consulted.

Wetland evaluations were performed utilizing criteria proposed by the Highway Methodology, US Army Corps of Engineers.

### WETLAND DESCRIPTIONS

According to the *Atlas of the Public Water Supply Sources and Drainage Basins of Connecticut*, the study area lies within the Connecticut River Main Stem Regional Basin. Succor Brook flows through the property and drains into the Connecticut River at the north edge of an existing parking lot for the Goodspeed Opera House. Wetland resources on the property belong to the riverine and palustrine ecological systems which are two of the five systems recognized by the U. S. Fish and Wildlife Service's wetland classification system described in *Classification of Wetlands and Deepwater Habitats of the United States*, Cowardin, et al. 1979.

The classification system is used to describe wetland cover types. The riverine wetlands include the Connecticut River and its associated wetlands, while the palustrine wetlands are located in an area bounded by Lumberyard Road and Creamery Road.

#### **Riverine Wetlands**

Within the study area wetlands have been flagged adjacent to the Connecticut River, from the boat launch south of the parking lot north to Succor Brook. This boundary represents a vegetated fringe that is subject to tidal action. There are no wetland soils and it is essentially a rip-rap stone lined embankment. Within the limits of the flagging, the dominant tree species are eastern cottonwood, silver maple, red maple, sycamore, and green ash. Black locust, elm, black cherry, and eastern red cedar are also present.

The shrub and vine layer is relatively dense in places and includes species such as multiflora rose, Morrow's honeysuckle, oriental bittersweet, Japanese honeysuckle, false indigo bush, fox grape, and silky dogwood. For the most part, the shrubs and vines comprise non-native species considered to be widespread and invasive in Connecticut.

A number of herbaceous species are present within this area. Species include switch grass, beach clothbur, prairie cordgrass, wild rye, deer tongue grass, blue joint grass, Canada goldenrod and tall goldenrod.

With respect to observed wildlife, a few bird nests were observed within the trees and shrubs. Herring gulls were seen along the river and a flock of white-throated sparrows were feeding amongst the brushy shrubs. The primary function of this vegetated strip of land adjacent to the Connecticut River is to serve as a buffer to the river and to stabilize the streambank and shoreline against erosion.

## Palustrine Wetlands

The wetlands that lie between Lumberyard Road and Creamery Road are best classified as palustrine emergent wetlands, portions of which contain scrub shrub habitat. The scrub shrub portions of the wetlands are located along Succor Brook and in the portion of the wetland that lies to the south side of Succor Brook. These wetlands contain areas that are permanently saturated and areas that are seasonally saturated.

Although the area between the two roads is essentially one wetland system associated with Succor Brook, there are subtle differences between the wetlands that lie to the north of the brook contrasted to the wetlands south of the brook. Along the brook itself, there are many shrubs and small trees including pussy willow, speckled alder, elderberry, raspberry, multiflora rose, sycamore, ash, red maple, cottonwood and black locust.

To the north of the brook, there is a wet meadow wetland that contains a relatively rich diversity of herbaceous species including arrow-leaved tearthumb, soft rush, Olney three-square, purple-leaf willow-herb, yellow iris, shallow sedge, jewelweed, and several species of goldenrod. For the most part, the wet meadow is free of invasive species; however, purple loosestrife and reed canary grass are present in the meadow and Japanese knotweed is prevalent on the north side of Succor Brook.

South of Succor Brook, there is also wet meadow habitat and there is scrub-shrub habitat as well. There are some deep pockets of water within this portion of the wetland and there are fewer invasive species within the wetland south of the brook. This portion of the wetland is richer in overall species and structural diversity than the wetlands north of the brook.

Herbaceous species include common cattail, Joe Pye weed, blue vervain, halberd-leaved tearthumb, New York ironweed, soft rush, yellow iris, purple-leaved willow-herb, jewelweed, false nettle, wood reed grass, blue joint grass, sweet flag, sensitive fern, tussock sedge, shallow sedge, lakeland sedge, woodland bulrush, and burreed. Shrub species include pussy willow, willow, speckled alder, elderberry, multiflora rose, and Morrow's honeysuckle.

The wetlands afford good wildlife habitat opportunities and a number of songbirds were noted within these wetlands including Carolina wren, cardinal, mockingbird, white-throated sparrows, chickadees, and a flock of over-wintering yellow-rumped warblers. Deer trails were evident throughout the wetlands. The wet meadow habitat is also well-suited to small mammals such as rabbit, opossum, skunk, raccoon, mice, and voles.

The primary functions of these wetlands include groundwater recharge/discharge, sediment/toxicant retention, nutrient removal/retention/transformation, sediment/shoreline stabilization, wildlife habitat, and visual quality/aesthetics.

The functions and values analysis in this report follows the Highway Methodology that was developed by the US Army Corps of Engineers. This Methodology uses a descriptive approach and identifies thirteen potential wetland functions and values that may or may not be present within the wetland being studied.

Wetland *functions* are intrinsic properties of a wetland ecosystem and include all processes necessary for sustaining a wetland ecosystem such as primary production and nutrient cycling. Wetland *values* are benefits derived from one or more wetland functions and the physical characteristics associated with the wetland and are based upon human judgment of the merit or importance of wetland functions.

Each function/value is discussed in detail below. The italicized portion provides a definition and explanation of the function as provided in the Highway Methodology Workbook. Following the definition, the evaluation of the wetlands with respect to each function is provided. In some cases, a particular function may not be applicable to the subject wetland.

- **GROUNDWATER RECHARGE/DISCHARGE**

*This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance of either.*

These wetlands are underlain by alluvial soils that are of two drainage classes: poorly drained and moderately well-drained. The poorly drained wetland soils are groundwater supported and therefore are groundwater discharge wetlands. At dry times of the year, the wetlands provide base flow to Succor Brook and then act as groundwater recharge.

- **FLOODFLOW ALTERATION**

*This function considers the effectiveness of the wetland in reducing flood damage by water retention for prolonged periods following precipitation events and the gradual release of floodwaters. It adds to the stability of the wetland ecological system or its buffering characteristics and provides social or economic value relative to erosion and/or floodprone areas.*

This wetland is capable of some floodwater storage as it is relatively broad and well-vegetated. It is also adjacent to Succor Brook and acts as a floodplain for the brook. Nonetheless, it is small in size relative to its watershed, therefore floodflow alteration, while a function of the wetland, is not considered to be one of its primary functions.

- **FISH AND SHELLFISH HABITAT**

*This function considers the effectiveness of seasonal or permanent watercourses associated with the wetland in question for fish and shellfish habitat.*

Succor Brook is fisheries resource; however, the wetland itself does not contain fisheries food resources, spawning grounds or other elements of fish habitat, thus fish and shellfish habitat are not considered to be one of the wetland's primary functions.

- **SEDIMENT/TOXICANT RETENTION**

*This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens in runoff water from surrounding uplands, or upstream eroding wetland areas.*

The wetland provides an opportunity for sediment trapping as water flows slowly through the wetland and there is dense vegetation throughout that will help to trap sediments. Surrounded by existing roads, the wetland likely receives inputs of sediments, particularly during winter from roads sands. Succor Brook is likely to transport sediments downstream and these sediments may become trapped in the wetlands as the water flows into the floodplain wetlands. Sediment/toxicant retention is therefore a primary function of this wetland.

- NUTRIENT REMOVAL/RETENTION/TRANSFORMATION

*This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands, and the ability of the wetland to process these nutrients into other forms or trophic levels. One aspect of this function is to prevent ill effects of nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers or estuaries.*

Pockets of ponded water in the wetland, diverse and abundant vegetation, its potential for sediment trapping, and the diffuse water flow through the wetland make it suitable for nutrient removal, retention and transformation.

- PRODUCTION EXPORT

*This function evaluates the effectiveness of the wetland to produce food or usable products for man or other living organisms.*

There are numerous seeds from grasses, sedges and wildflowers within this wetland as well as fruits from trees and shrubs. These are food resources for wildlife species and production export is one of the functions of this wetland.

- SEDIMENT/SHORELINE STABILIZATION

*This function considers the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.*

The wetland is associated with Succor Brook and the diverse assemblage of vegetation can withstand flood events and serve to anchor the streambanks, thus preventing severe erosion of the brook channel. Sediment/shoreline stabilization is therefore a primary function of the wetland.

- WILDLIFE HABITAT

*This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and /or migrating species are considered.*

As indicated, a number of faunal species were observed or otherwise noted during the field investigation. The wetland is situated within the center of East Haddam and provides an important habitat for wildlife within a relatively densely developed area.

- RECREATION (Consumptive and Non-Consumptive)

*This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting and other active or passive recreational activities. Consumptive opportunities consume or diminish the plants, animals, or other resources that are*

*intrinsic to the wetland. Non-consumptive opportunities do not consume or diminish these resources of the wetland.*

Recreational opportunities are primarily passive or non-consumptive. They include nature study, bird-watching, or enjoying the sights on the nearby Connecticut River.

- EDUCATIONAL SCIENTIFIC VALUE

*This value considers the suitability of the wetland as a site for an “outdoor classroom” or as a location for scientific study or research.*

The wetland is easily visible from Lumber Yard Road and there is a town facility with a gazebo and pond adjacent to the wetland. It could therefore be utilized as an educational resource, although this is not a primary value for the wetland.

- UNIQUENESS/HERITAGE

*This value considers the effectiveness of the wetland or its associated waterbodies to provide certain special values. These may include archaeological sites, critical habitat for endangered species, its overall health and appearance, its role in the ecological system of the area, its relative importance as a typical wetland class for this geographic location. These functions are clearly valuable wetland attributes relative to aspects of public health, recreation, and habitat diversity.*

There are no known endangered or threatened species within the wetland, nor is the wet meadow a unique wetland cover type in the region.

- VISUAL QUALITY/AESTHETICS

*This value considers the visual and aesthetic quality or usefulness of the wetland.*

The wetland contains a high diversity of herbaceous species, many of which have colorful and attractive flowers. It is also an important landscape feature within its location in the center of town. The visual quality and aesthetics are of high value for this wetland.

- ENDANGERED SPECIES HABITAT

*This value considers the suitability of the wetland to support threatened or endangered species.*

There are no known endangered or threatened species living within the wetland. However, it should be noted that DEP Wildlife Division has identified the area along the Connecticut River as an area where bald eagles perch during the winter months.

### 3.8 Floodplains

Due to the proximity of the project area to the Connecticut River, portions of the area lie within the 100-year flood boundary. The base flood elevation surrounding the river is 11', as depicted on FEMA Community Panel No. 0900630020B. More specifically, this area includes the area south of Route 82 near the Goodspeed Opera House and east of the Connecticut River. Additionally, the 100-year flood boundary includes approximately the Succor River and 30' on each side. The 500-year flood boundary, which surrounds the 100-year flood boundaries, is present on site.

### 3.9 Input from Public Participation – First Round

As previously described, the public participation program consisted of two rounds of public meetings with several different groups. A summary of the inputs from the first round of meetings follows:

#### Regulatory Focus Group Meeting

On November 20, 2003 a meeting was held with Town regulatory officials to help guide the design process. It was the intent of the meeting to gather information from the attendees to determine the key issues to address in the conceptual design.

The Close, Jenson, & Miller concept plan was presented and reviewed for comment. It was a general consensus that while the design was pedestrian friendly by use of walkways and protective greens, the parking lot layout was over designed for the accommodation of more cars than was appropriate for the scale of East Haddam Village.

A general discussion was held to determine the vision of the town regulatory officials for this development. The following list outlines the issues and ideas developed by the regulatory officials:

- Realign Route 82 to improve existing curve in front of Town Hall
- Relocate Town Hall
- Provide easy egress and ingress throughout East Haddam Village;
- Development of public areas along river instead of parking lots to enhance the town;
- Development of small satellite parking areas to encourage pedestrians to walk more;
- Development of a pedestrian friendly plan;
- Widen and expand existing sidewalks
- Development of an economically viable plan;
- Development of a plan that meets the interests of all groups involved;
- Provide short term parking in critical areas;
- Provide additional docks along the river;
- Design the downtown area as a town center and a tourist center;
- Design traffic calming measures to decrease the speed of passing traffic; and
- Encourage ferry access to East Haddam Village for tourists.

#### Non-Regulatory Focus Group Meeting

On November 19, 2003 a non-regulatory meeting was held with Town non-regulatory officials to help add input to the design process.

The Close, Jenson, & Miller plan was discussed and reviewed. In summary, the landscaping, pedestrian ease, Lumberyard realignment, and level of water front access were well liked. The Rotary Club, owner of the land surrounding the existing pond and gazebo, approved of the use of their land.

In addition to reviewing this plan, the groups discussed their general needs and vision for the development of a new concept plan. The following list summarizes the comments made by the non-regulatory officials:

- Relocate the Town Hall;
- Replace sidewalk between the actors' housing area and the Village center;
- Development of a path that loops the entire Village, including the Nathan Hale School;
- Development of short loop paths for patrons of the Goodspeed Opera House and long loops for day trippers;
- Development of a pedestrian friendly plan;
- Development of small satellite parking areas to encourage pedestrians to walk more;
- Provide separate bicycle lanes due to high traffic volumes;
- Design traffic calming measures to decrease the speed of passing traffic;
- Provide diverse attractions throughout the Village
- Provide additional docks along the river; and
- Provide a natural/informal look to the redeveloped riverfront and Marsh Pond.

#### Goodspeed Musicals Meeting

On November 24, 2003 a meeting was held with Goodspeed Opera House representatives to add input to the design process. It is the desire of the Town to promote the success of Goodspeed; therefore, it is important that their needs are considered in the design process.

After reviewing the comments set forth by the Town regulatory and non regulatory officials, the GOHF expressed the following as their needs should they stay in East Haddam:

- Development of a second theater;
- Parking lot design that assures Goodspeed patrons will have ample, easily accessible parking;
- Approval of a zone change;
- Development of a Village that allows Goodspeed actors to access all needs by walking;
- Development of East Haddam Village so to encourage patrons to visit the Village;
- Development of additional bus parking.

#### Public Participation Meeting

A public meeting was held on December 10, 2003 to solicit feedback from the community. The following list outlines the ideas, issues, and comments made at this meeting:

- Development of a pedestrian friendly plan;
- Design traffic calming measures to decrease the speed of passing traffic;
- Development of vehicular looping to circulate traffic through the Village;
- Provide separate bicycle lanes due to high traffic volumes;
- Realign Route 82 to improve existing curve in front of Town Hall;
- Provide a pedestrian area in front of Gelston House;
- Utilize plantings and landscapes to separate pedestrians from traffic;
- Development of a river walk that connects to pedestrian trails and sidewalks;

- Connect walking trails between Chapman Pond, schoolhouse, river front, Village, and Gillette Castle;
- Development of public wilderness areas, and Town green;
- Development of small satellite parking areas that blend with the surroundings to encourage pedestrians to walk more;
- Development of on street parking;
- Improve road geometry to eliminate traffic confusion; and
- Relocation of Town Hall.

In general, the top three concerns of the public can be summarized as follows:

1. Parking
2. Traffic
  - a. Conflicts Between Pedestrians and Vehicles
  - b. General Traffic Patterns
3. River Access

## 4.0 ANALYSIS

### 4.1 Roads

#### 4.1.1 Design Criteria

Design Criteria for the project was developed based on the Connecticut Department of Transportation's Highway Design Manual, 2003 Edition. Due to the restricted ROW, existing conditions and the desire to retain the existing character of the village, it is anticipated that waivers for substandard design elements may be required as part of the detailed design. Design elements will be evaluated and waivers will be better defined during the Preliminary Design Phase of the project. Design Criteria for Route 82, Route 149, Lumberyard Road and Creamery Road is attached in Appendix F.

#### Route 82 Village Area

1. Classification - Rural Minor Arterial
2. AADT (Design year 2025) – 10,000 vehicles per day
3. Design Speed – 20 / 25 mph (based on 85<sup>th</sup> percentile speeds of less than 25 mph)
4. Lane Width – 12 feet
5. Shoulder

Desirable	8 feet
Minimum	2 feet
6. Grade

Minimum	0.5%
Maximum	11%
7. Superelevation

Maximum	6%
Minimum-	Normal Crown (1.5 - 2%)
8. Horizontal Curvature (with 6% superelevation) - 190 feet (for 25 mph)
9. Stopping Sight Distance (level grade)

Minimum	115 feet (for 20 mph)
	155 feet (for 25 mph)
10. Intersection Sight Distance (two lane roads – left and right turns)

Minimum				
	Passenger car	SU Trucks	Tractor Trailers	
	225	280	340	(for 20 mph)
	280	350	425	(for 25 mph)

#### 4.1.2 Traffic Calming

The Connecticut Department of Transportation (ConnDOT) does not have a policy or standard guidelines for the design of traffic calming measures on state roads. As such, the current procedure adopted by the Department's Office of Traffic Engineering entails a review of each project on a case by case basis. ConnDOT reviews each request based on the following criteria:

- Functional classification of the road
- Speeds (posted and 85th%)
- Peak and daily traffic volumes
- Accident history, and safety of pedestrians
- Cost, right of way and long term maintenance requirements

The provision of traffic calming measures was identified as one of the primary goals of this project and was highlighted as critical by the “Vision for East Haddam Village”, and their “Guiding Principles”. Traffic calming was considered by the project Steering Committee to be a very important element of this mobility project.

The Institute of Transportation Engineer’s “Traffic Engineering Handbook” indicates the origins of traffic calming in “neighborhood traffic management”. Most familiar forms of traffic calming worldwide involve the use of physical treatments at the local street level to reduce the motor vehicles’ intrusion into and effects on community life. International traffic calming practice is expanded to include busier corridors carrying up to 20,000 cars per day. The term traffic calming in present U.S. practice entails the implementation of physical measures to reduce vehicular speeds and/or discourage traffic from traveling along the subject roadway.

Based upon existing conditions data identified in the Data Gathering segment of this report, the following traffic objectives were identified for consideration of traffic calming improvements to mitigate traffic impacts upon the Village of East Haddam:

- Route 82 west bound approach to East Haddam: Speed reduction
- Route 149 southbound approach to East Haddam: Speed reduction
- Pedestrian crossings at the Goodspeed opera house: Improve sight lines and driver awareness of the crosswalk

A variety of traffic calming measures were considered during the preliminary concept layouts in conjunction with the highway design, pedestrian accessibility, and site development objectives for the project.

1. Speed Humps – These are rounded raised areas placed across the roadway to force a driver to slow down and negotiate the hump. This measure is inexpensive and has been proven to be effective in slowing travel speeds.

Speed humps vary in length from 10 to 14 feet (in direction of travel) and are typically raised 3 to 4 inches from the adjacent pavement elevation. Speed humps

must be tapered at the ends to allow for drainage along the edge of roadway. Installation of the humps would include signage and pavement markings or pavement texturing to avoid serious safety concerns where drivers are unable to see the speed humps at night or under adverse weather conditions.

Speed humps are effective on local streets where very low speeds are desired. Typically a driver must slow their vehicle down to 10 mph to traverse the speed hump. They are typically not used on state roadways, or roadways with a posted speed limit of more than 20 mph due to the speed differential between travel speeds and the speed to traverse the hump. Emergency vehicles and large trucks must significantly reduce their travel speed to traverse the speed hump which may increase emergency response times, and noise pollution from trucks decelerating and accelerating. Air pollution may increase as a result of frequent trucks and buses.

Speed humps will not be incorporated into this mobility project because unimpeded access for emergency vehicles must be maintained along state roads. Additionally, noise and air pollution would present a problem with trucks and buses that would brake and accelerate in the middle of the Village and the residential community.

2. Roundabouts - Roundabouts can be beneficial for moderating traffic speeds and improving safety when compared to a traffic signal. Roundabouts need to be large enough to accommodate larger vehicles and thus may require additional right of way. This measure was investigated for the Route 82 and Route 149 intersection. Due to the significant grade differential between Route 149 and Route 82 and limited right of way, the roundabout was determined not to be a feasible alternative.
3. Chokers - Chokers are curb extensions at mid-block locations that narrow the cross section of the roadway and often include crosswalks. They may be used to provide drivers with a visual warning of upcoming pedestrian crosswalks. The disadvantage of these measures include elimination of on-street parking and having a minimal effect on travel speeds due to the lack of vertical or horizontal deflection required. They may require bicyclists to briefly merge with vehicular traffic.

Installation of chokers may not be feasible on Routes 82 and 149 because the existing cross sections of these roadways are narrow and in some locations substandard. A modification of this concept will be investigated for the Route 149 corridor.

4. Chicanes – These are curb extensions that alternate from one side of the roadway to the other, forming S-shaped curves. This concept would require roadway realignment to incorporate the curb extensions and additional pavement area to create the lateral deflections. Installation of this measure was not pursued further due to limited right of way on Routes 82 and Route 149.
5. Median island narrowings – These involve a raised island in the center of the road to narrow the travel lanes. These islands are often landscaped and can provide

pedestrian refuge if a crossing is present. Median islands are more appropriate for local streets and entrances to neighborhoods.

Due to the lack of horizontal or vertical deflection, these measures do not reduce travel speeds significantly. This type of measure is not feasible on Routes 82 and 149 because the existing roadway and R.O.W. is narrow in many locations

6. Textured Pavements - This measure involves the use of stamped pavement or alternate paving materials to create an uneven surface. These may be used to emphasize pedestrian crossings or to identify a "gateway" at an intersection.

Textured pavements are aesthetically pleasing but depending on the type of material can be costly and may increase tire noise levels. This measure will be used for pedestrian crossings on Route 82 and Route 149. At the Route 82 pedestrian crossing in front of Gelston House, textured pavements will be used in conjunction with possible in-street pavement lights.

7. In-Street Pavement lighting - This concept involves the use of lights embedded within the pavement on both sides of a crosswalk. The lights are actuated by a pedestrian push button and are primarily visible by the approaching vehicles. ConnDOT has approved the use of these lights on State roads in other towns on a case by case basis with the condition that the municipality shall be responsible for the installation and maintenance of the equipment.

8. Stop signs – Installation of stop signs on state roads require an in-depth study of traffic conditions and a comparison of industry standard warrants to identify if the location meets the minimum criteria. Stop signs are not used for calming traffic. Installation of unnecessary stop signs may lead to an increase in accidents if the intersection is not consistent with the driver's expectations. Additionally, unnecessary stop signs may result in drivers familiar with the road to ignore the regulatory sign if not properly enforced.

9. Landscaping/Streetscaping amenities – The addition of proper landscaping and streetscaping elements along the roadway may provide the driver with an awareness that he/she is entering a pedestrian friendly area. The use of plantings, signage, benches, lighting elements and other objects may create a "sense of arrival" and encourage slower speeds.

This measure may be incorporated along Route 82 and Route 149 to create the "village environment", and the sense of arrival in the village. In locations where the R.O.W. is adequate, these elements may be introduced in the buffer areas between the edge of road and sidewalk. Location of these elements must be studied carefully to avoid impacts to sightlines or introducing roadside hazards.

10. On-Street Parking – The addition of on-street parking will provide the driver with an awareness that they are entering a pedestrian active area. This will encourage slower speeds. On-street parking may not be feasible on Routes 82 and 149 because the

existing cross sections of these roadways are narrow and in some locations substandard.

4.1.3 Accident Analysis

One major concern of the public, expressed in the first round of public participation meetings, was the unsafe nature of the roadway intersections in the Village Area. As the following chart summarizes, the accident history does not indicate a significant accident history. In fact, the higher accident rates were noted in the Haddam intersections, not in East Haddam, and none of the study area intersections exhibit significant accident history.

**Accident Data**

INTERSECTIONS/ROAD SEGMENTS	ACCIDENTS PER YEAR*					
	1999	2000	2001	2002	Total	Average
Route 82/Route 9 Connector at Route 154	2	6	0	4	12	4
Route 154 and Route 82 (northerly)	1	3	3	2	9	3
Route 82 at Lumberyard Road	1	1	1	2	5	1
Route 82 at Route 149 and Creamery Road	0	1	0	1	2	1

\*Values indicated are number of accidents within 200 feet of each intersection during time period shown. Data provided by the Connecticut Department of Transportation. Values are from October 1, 1999 – September 30, 2002

4.1.4 Traffic Signal Warrant Analysis

The Manual of Uniform Traffic Control Devices (MUTCD) includes the following eight warrants to determine if a traffic signal should be considered at an intersection. One or more of the warrants should be satisfied in order for a traffic signal to be considered.

- Warrant 1: Eight-Hour Vehicular Volume
- Warrant 2: Four-Hour Vehicular Volume
- Warrant 3: Peak Hour
- Warrant 4: Pedestrian Volume
- Warrant 5: School Crossing
- Warrant 6: Coordinated Signal System
- Warrant 7: Crash Experience
- Warrant 8: Roadway Network

Traffic signal warrant analyses were conducted in accordance with the MUTCD for the following intersections:

- Route 82/Route 9 connector at Route 154
- Route 82 at Lumberyard Road

- Route 82 at Creamery Road.

Copies of these warrant analyses are provided in Appendix F.

The intersections of Route 82 at Route 149/Creamery Road, and Route 82 at Lumberyard Road were not warranted. The minimum volume thresholds for the minor streets were not satisfied by the projected traffic volumes. Therefore, traffic signals are not warranted for either intersection in the Village Area.

A traffic signal was found to be warranted at the Route 82/Route 9 Connector at Route 154. Warrants 1, 2, 3 and 8 were satisfied for this intersection. The existing traffic volumes on the major and minor approaches are sufficient to meet the criteria for consideration of a traffic signal.

#### 4.1.5 Capacity Analysis

Capacity analyses for both signalized and unsignalized intersections were conducted using Synchro Professional Software, version 5.0.

In discussing intersection capacity analyses results, two terms are used to describe the operating condition of the road or intersection. These two terms are volume to capacity ratio (v/c) and level of service (LOS).

The v/c ratio is a ratio of the volume of traffic using an intersection to the total capacity of the intersection (the maximum number of vehicles that can utilize the intersection during an hour). The v/c ratio can be used to describe the percentage of capacity utilized by a single intersection movement, a combination of movements, an entire intersection approach, or the intersection as a whole. As the v/c ratio approaches 1, the intersection nears capacity and it may become impossible to accommodate all the vehicles attempting to travel through the intersection.

LOS is a measure of the delay experienced by stopped vehicles at an intersection. LOS is rated on a scale from A to F, with A describing a condition of very low delay (less than 10 seconds per vehicle), and F describing a condition where delays will exceed 80 seconds per vehicle. Delay is described as a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Therefore, intersections with longer delay times are less acceptable to most drivers.

LOS is generally used to describe the operation (based on delay time) of both signalized and unsignalized intersections, while v/c ratio is applied to signalized intersections only. These definitions for v/c ratio and LOS, as well as the methodology for conducting signalized and unsignalized intersection capacity analyses, are taken from the "2000 Highway Capacity Manual" published by the Transportation Research Board.

In discussing unsignalized intersection capacity analyses, the term "level of service" (LOS) is used to provide a description of the delay and operational characteristics of the turns from

the minor street (stop sign controlled) to the major street, and turns from the major street to the minor street. Through vehicles are not delayed by the minor street and do not experience delay, therefore they are not rated with a level of service.

Using the above referenced methodologies, Weekday AM, PM and Sunday PM peak hour capacity analyses were conducted at the four study area intersections, and results are summarized in the following Table. Copies of the analysis worksheets can be found in [Appendix F](#).

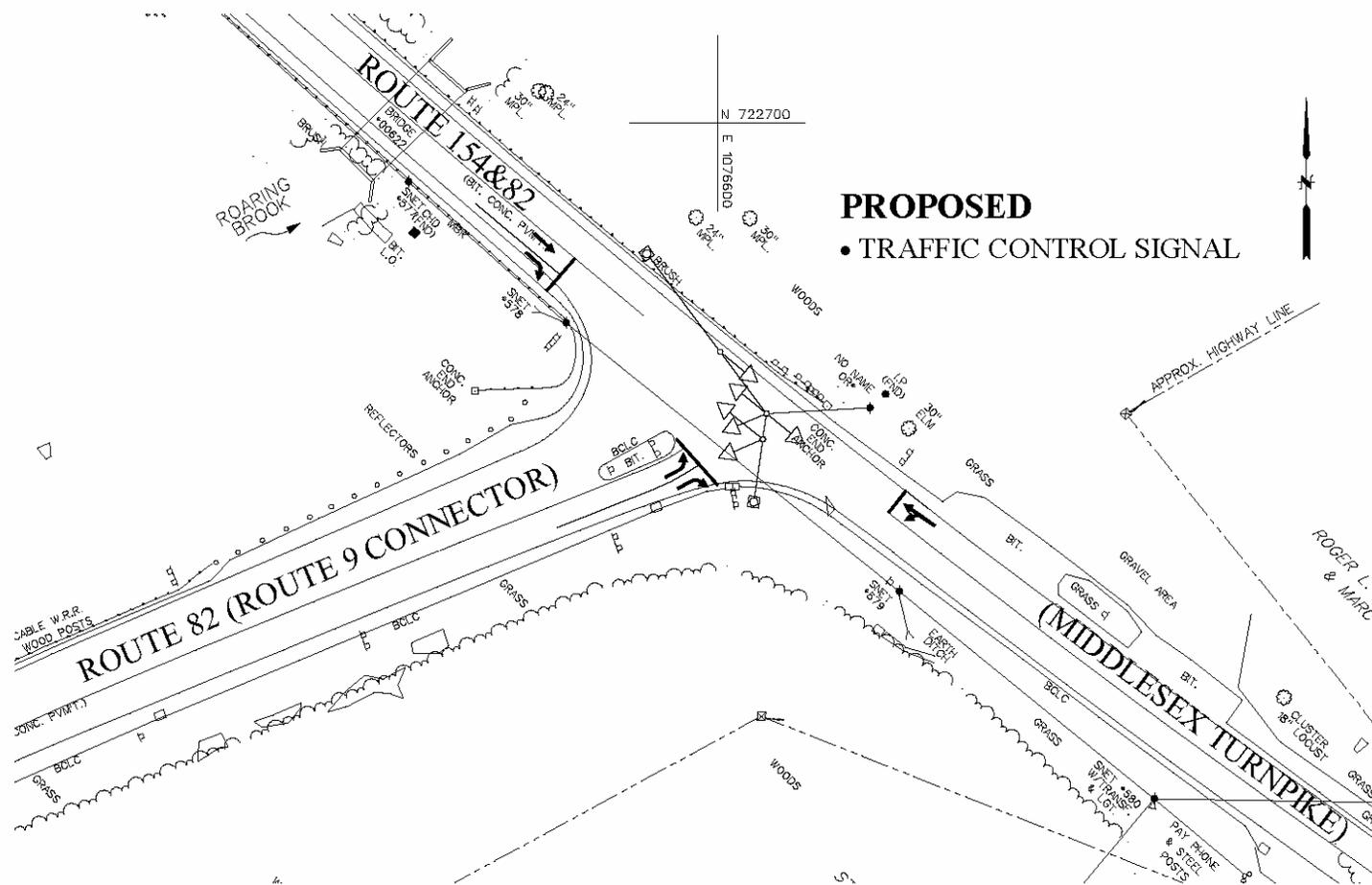
### Level of Service (LOS) Summary

Int.	Name	2003 Existing			2025 With 700 Seat Expansion		
		AM	PM	Sunday	AM	PM	Sunday
1	Route 82 Connector at Route 154						
	Northbound	A	A	A	A	A	A
	Eastbound	D	F	B	F	F	F
2	Route 154/82 and Route 82 (Bridge Road)	B	C	C	C	F	F
3	Route 82 (Bridge Road) and Lumberyard Road						
	Southbound	A	A	A	A	A	B
	Northbound	B	E	D	D	F	F
4	Route 82 (Main Street) and Route 149						
	Southbound	C	B	B	F	C	F
	Northbound	A	F	C	D	F	F
	Eastbound	C	B	A	C	C	E
5	Route 82 (Norwich Road) and Creamery Road						
	Southbound	A	A	A	A	A	A
	Northbound	A	A	A	A	A	A
	Westbound	B	C	B	C	B	E
	Eastbound	B	C	D	C	F	F

The Connecticut Department of Transportation considers level of service D to be acceptable for peak hour operation at State owned intersections. Locations where LOS deteriorated below LOS D were considered for mitigation improvements. Additionally, mitigation improvements were considered to address many of the existing conditions deficiencies noted in the Roads and Intersections section of this report.

#### 4.1.6 Recommended Improvements

The need for intersection improvements was identified based on the analysis of accident data, signal warrants, and intersection capacity. Improvements should be constructed to mitigate the traffic impact associated with the background growth of traffic in the future, and the potential for development within the East Haddam Village. Various mitigation improvements were evaluated for each location. The relative effectiveness and cost benefits were compared for each combination of improvements. Copies of the intersection analyses with improvements, and a table summarizing level of service “with future improvements”, are provided in [Appendix F](#). It should be noted that recommendations for improvements to State roadways are subject to the review and approval of the Connecticut Department of Transportation.

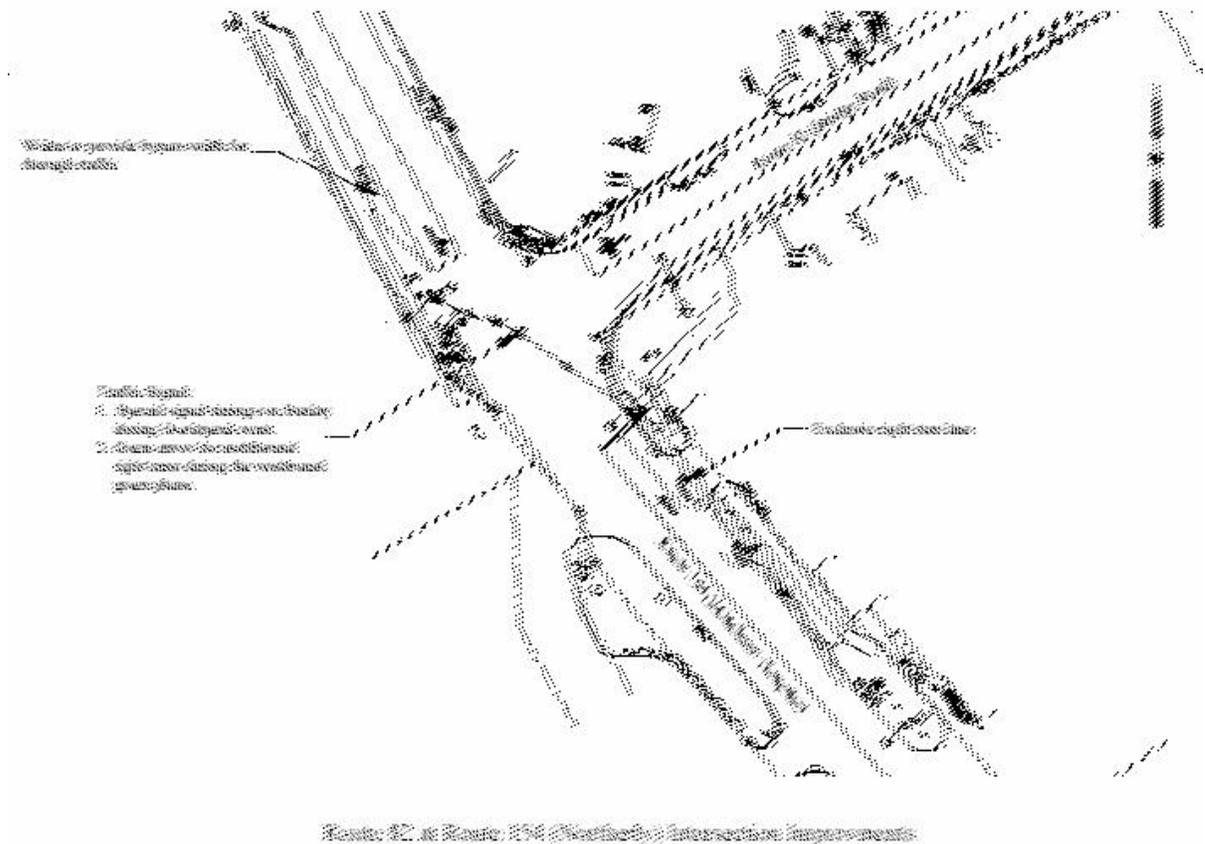


ROUTE 82 (ROUTE 9 CONNECTOR) AT ROUTE 154&82 (MIDDLESEX TURNPIKE)  
INTERSECTION IMPROVEMENTS

Many recommendations are described in detail under the Alternatives Analysis section of this report. The following intersection specific recommendations supplement the Focus Area improvements:

1. Route 82 at Route 154 (southerly): Install traffic signal control to allow the intersection to operate at LOS C or better during peak hour operations as depicted on the previous page:
2. Route 82 at Route 154 (northerly):
  - Widen Route 82 northbound to provide an exclusive right turn lane
  - Modify the traffic signal to provide a right turn arrow for northbound Route 82 during the westbound Route 82 green phase.
  - Widen Route 82 southbound to provide width for through vehicles to bypass left turning traffic during the bridge operations.
  - Modify the traffic signal to implement a special Sunday traffic signal timing plan to address conditions during a theatre event. This timing plan will increase the green time for westbound Route 82 to accommodate traffic leaving the Goodspeed Opera House following an event.

The above improvements will allow the intersection to operate at LOS C or better during peak hour operations as depicted on the following plan:



3. Horizontal curve east of the Swing Bridge: Widen Route 82 to straighten the alignment and minimize the horizontal curve within the available right of way. This will improve the safety of truck movements and access to the bridge.
4. Police or professional traffic control personnel should be provided at key intersections prior to and after significant events at the Goodspeed Opera House. A traffic management plan should be developed for significant events to aid in traffic circulation. The following key intersections should be included:
  - Route 82 at Lumberyard Road
  - Route 82 at Route 149
  - Creamery Road
5. Bus circulation, parking, and traffic management should be considered as part of the detailed development plans for the Goodspeed Opera House expansion. A detailed traffic management plan (TMP) will be required for special events. This TMP will need to be tailored to specific event types depending on time of day, expected attendance, on site circulation, bus service, and resolution of the pick up/drop off area.

#### 4.2 Succor Brook Crossing (Lumberyard Road)

A hydraulic analysis review was conducted for Lumberyard Road over Succor Brook. A Flood Insurance Study (FIS) for the Town of East Haddam was conducted by the Federal Emergency Management Agency (FEMA) in May 1979 for Succor Brook. The FEMA analysis and the independent hydraulic analysis conducted by The Maguire Group, included in the EIE documents, were reviewed for adequately conveying the 100-year flood through the existing culvert. A hydraulic assessment of three conceptual improvement alternatives for the Lumberyard Road crossing is also presented herein.

The existing structure consists of a 9' wide by 9' high by 24' long precast concrete box culvert. The existing stream channel is well defined, approximately 20' wide at the inlet and outlet with little or no transition to the 9' wide culvert. Stone walls line the banks of the stream channel up to the structure upstream and downstream.

As shown in the FIS, the 100-year flood elevation of Succor Brook is approximately 11.0 at the Lumberyard Road bridge crossing. As indicated in the FIS, a backwater influence is created by the Connecticut River which is approximately 300' downstream of the culvert crossing. As shown in the FIS, the existing structure can adequately convey the 100-year flood with an underclearance of approximately 1.0' below the top of the culvert.

Subsequent to the EIE document, CJM conducted a detailed hydraulic analysis of Succor Brook from the Creamery Road crossing to the Connecticut River using the flows from the FIS report. The datum in the CJM analysis appears 3.8' lower than the FIS. Otherwise, the analysis generally seemed consistent with the FIS under existing conditions. The CJM analysis showed less than 0.5' of under clearance at the culvert.

The Connecticut Department of Environmental Protection (CT DEP) has expressed concern about the existing culvert. The elevation of the bottom of the culvert is too high and presents a barrier to fish travel. There is also significant scour related to this condition.

## 5.0 EVALUATION OF ALTERNATIVES

### 5.1 Evaluation Criteria

Several alternatives were developed and evaluated for each area of concern. These alternatives should be evaluated based on the following considerations:

- Land Use and Consistency with Plan/Vision
- Parking Needs
- Environmental Impacts
- Traffic Impacts
- Construction Cost
- ROW

A balance between these factors must be obtained. The nature of development causes these items to be in “tension” with one another. This means that changes, or concessions, in one area may positively, or negatively, impact another. The “best” alternative depends on how each individual weighs each criterion.

### 5.2 Alternatives Analysis

#### 5.2.1 Roadway Alignments

There were three (3) focus areas concerning roadway alignments within the study area:



## **Focus Area 1 – Goodspeed/Town Office Section of Route 82**

Four major alternatives with several minor variations on each were considered for this focus area and are depicted in Appendix J:

### Existing Alignment with Pull Off Area

There are several positive outcomes associated with maintaining the existing alignment, which include:

- Safer Lumberyard Road intersection can be provided by creating a new tee intersection without re-alignment of Route 82.
- Traffic Calming already exists, as demonstrated by the existing 85<sup>th</sup> percentile speed data
- Drop-Off Area could be clarified
- Low construction cost

However, there are several negative outcomes which must also be considered:

- Pick-Up not addressed
- Insufficient sight lines make area uncomfortable for pedestrians and potentially dangerous considering additional pedestrian traffic associated with proposed development

### Larger Radius with Pull Off Area

There are several positive outcomes associated with this proposed alignment, which include:

- Safer Lumberyard Road intersection can be provided by creating a new tee intersection
- Clarifies Drop-Off Area

However, there are several negative outcomes which must also be considered:

- Pick-Up not addressed
- Insufficient sight lines make area uncomfortable for pedestrians and potentially dangerous considering additional pedestrian traffic associated with proposed development

### Smaller Radius with Pull Off Area – Recommended Alternative

There are several positive outcomes associated with this alignment, which include:

- Safer Lumberyard Road intersection can be provided by creating a new tee intersection
- Traffic Calming
- Drop-Off Area could be clarified
- Increased sight lines will make area pedestrian friendly

The major negative impact associated with this alignment is that the pick-up in front of the Goodspeed is not addressed.

One alternative that was conceptualized consisted of creating a town square. Unfortunately, the geometric and geographic constraints of the area did not make this alternative feasible.

It should be noted that because of space and geometric constraints, no feasible alternatives were found which would adequately address the pick-up needs at the existing Goodspeed. The design team encourages the Goodspeed to take steps in the design of their new theater to address the pick-up and drop off need to the greatest extent possible.

Traffic calming measures were considered in conjunction with this alternative to address the following objectives:

- Create a “sense of arrival” eastbound, entering the Village in addition to the Swing Bridge which acts as a gateway to the Village.
- Improve pedestrian crossings to create a high degree of awareness of this important pedestrian crossing.

The following traffic calming measures are recommended for this Focus Area, and are depicted in the Figure of the recommended option.

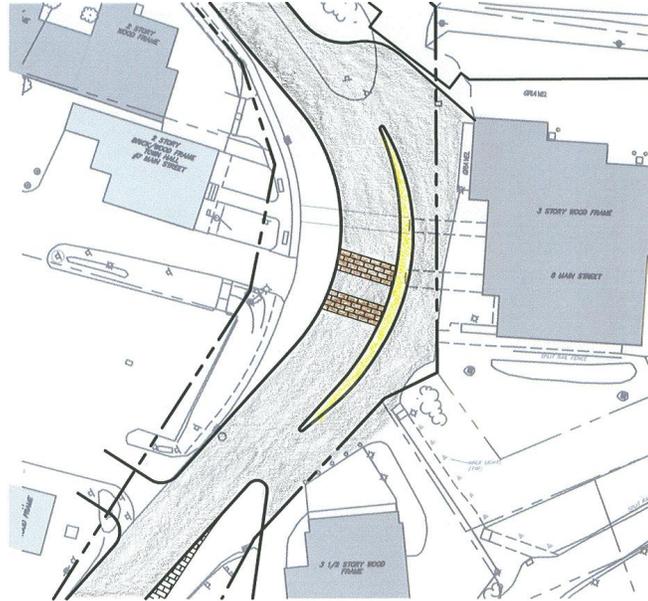
- Install a pedestrian crossing with a different pavement texture. Plantings and signage will be incorporated at this crossing to create the “sense of arrival” to the Village. Install new sidewalks along Route 82.
- Install pedestrian push buttons to actuate in-pavement pedestrian warning lights. Lights are flush to the pavement and visible to approaching traffic.
- Install a “crescent moon” island to segregate Route 82 through traffic from one way circulation in front of the Goodspeed. This will reduce the width of the pedestrian crossing and provides for adequate circulation for the drop-off area and some parking for the Goodspeed Opera House.

#### By-Pass of the Village Via New Alignment to the North

Previous studies had examined a design concept that would create a new roadway for traffic that would be constructed to the northwest of the Village center so through-traffic would not pass through the historic road configuration. After fully examining this alternative, these studies concluded that this alternative was not feasible. The design team reviewed the previous studies ([Appendix I](#)) and conducted an independent analysis.

The design team concurs with the previous study findings – this alternative is not feasible based on grade considerations from the existing swing bridge to the intersection with Route 149 and other design factors required for a State route.

Figure of Recommended Option:



### **Focus Area 2 – Succor Brook Crossing (Lumberyard Road) Alternatives**

Two major roadway alignment alternatives were considered for this focus area, as well as three alternatives for crossing the Succor Brook, and are depicted in Appendix K:

#### Existing Alignment

This option was not considered feasible since it did not address the substandard intersection between Lumberyard Road and Route 82. Maintaining the existing alignment also splits the developable area on the east side of the Gelston House and the previous Williams Chevrolet property. The value and development potential of this site would be constrained by maintaining the existing alignment.

#### New Tee Intersection and Existing Alignment

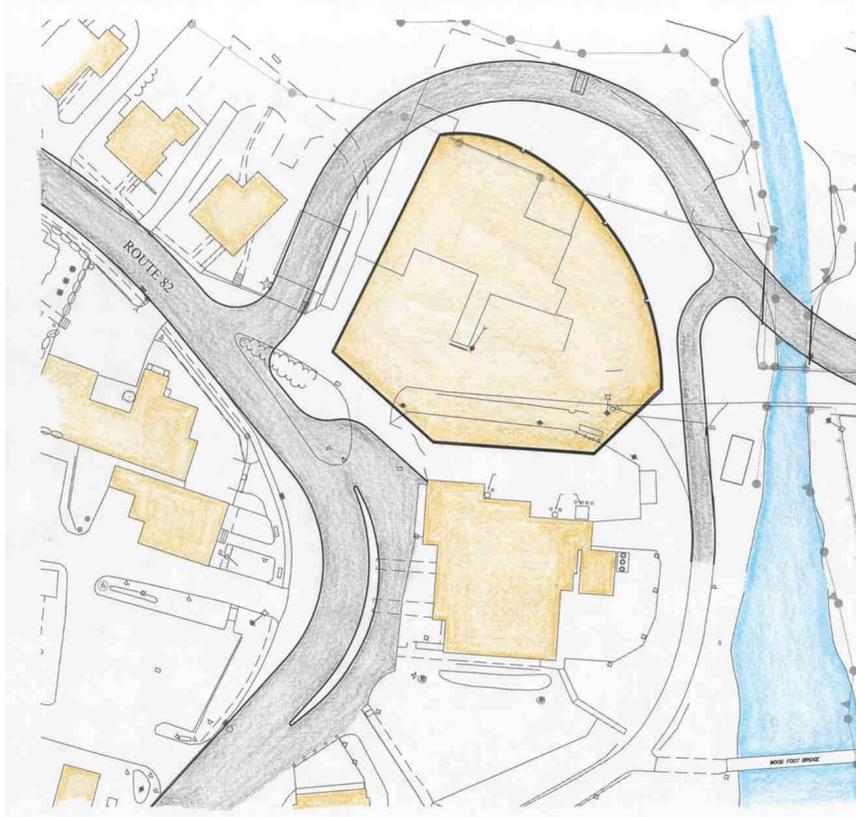
This option partially addressed the substandard intersection between Lumberyard Road and Route 82; however, there was still a deficiency with sight lines. In addition, maintaining the existing alignment splits the developable area on the east side of the Gelston House and the previous Williams Chevrolet property. The value and development potential of this site would be constrained by maintaining the existing alignment.

### New Tee Intersection and Alignment – Recommended Alignment

Although this option requires the demolition (or relocation) of an existing building, it would create a new tee intersection between Lumberyard Road and Route 82 which would address an existing deficiency.

Realignment of Lumberyard Road would also maximize the developable area on the east side of the Gelston House and the previous Williams Chevrolet property while simultaneously creating an edge between development and the wetlands further to the east.

Figure of recommended option:



### Crossing of Succor Brook

Three conceptual improvement alternatives were reviewed for the Lumberyard Road culvert in conjunction with the site and roadway improvements. The existing structure has several deficiencies that should be addressed. These deficiencies include a substandard roadway width, an inadequate approach guide rail and bridge railing, no pedestrian crossing, embankment erosion and scour, and difficult fish passage due to the abrupt transition from the channel up to the culvert. A preliminary hydraulic assessment for the alternatives is presented as follows:

1. Extend the Existing Culvert: This alternative would consist of extending the existing culvert from 24' to 36' to support the new roadway width. Additional head losses would be associated with the additional barrel length which could create a pressure flow condition at the inlet if the backwater were to rise above the top of the culvert. This alternative would not address the Connecticut Department of Environmental Protection (CT DEP) concern about the bottom of the existing culvert presenting a barrier to fish travel.
2. Maintain Existing Culvert with New Roadway Support Slab: A new roadway support slab would cantilever equally beyond the inlet and outlet to support the additional roadway width. This alternative is not expected to impact the hydraulic characteristics of the existing culvert considering there would be no modifications to the existing box culvert. This alternative would not address the CT DEP concern about the bottom of the existing culvert presenting a barrier to fish travel.
3. Construct a New Precast Arch Structure: Under this alternative, a precast concrete arch structure would replace the existing box culvert. The arch would span 16' to 20' with a rise of 7' to 8' respectively. The abrupt transition in width from the channel to the structure would be virtually eliminated with the wider span of the arch. Additionally, the lower height of the arch will reduce the profile of the roadway, minimizing sloping impacts to the adjacent wetland. Hydraulic capacity is expected to improve with the additional hydraulic opening from 81 square feet to approximately 120 square feet and this alternative would address the CT DEP concern about the bottom of the existing culvert presenting a barrier to fish travel.

### **Focus Area 3 –Route 82/Route 149 Intersection**

Four major alternatives with several minor variations on each were considered for this focus area and are depicted in Appendix L. It should be noted that the major complaint voiced by the public considering this intersection was that of driver confusion and that the accident history did not indicate an unsafe condition.

#### **Roundabout**

There are several positive outcomes associated with this alignment, which include:

- Allows re-circulation of traffic back into the Village Area
- Less confusion
- Smoother traffic flow
- Center area would provide an area for Nathan Hale statue
- Provides a gateway and sense of arrival
- Pedestrian friendly

However, there are several negative outcomes associated with alignment, which include:

- Very expensive
- Property taking required
- Significant grading concerns and retaining wall(s) required

#### Route 82 Tee into Route 149

There are several positive outcomes associated with this alignment, which include:

- Less confusion
- Pedestrian friendly

However, there are several negative outcomes associated with alignment, which include:

- Steep intersection approach created by re-alignment
- Lack of traffic calming measures
- Requires trucks to turn on a hill

#### Route 149 Tee into Route 82

There are several positive outcomes associated with this alignment, which include:

- Less confusion
- Pedestrian friendly

However, there are several negative outcomes associated with alignment, which include:

- Steep intersection approach created by re-alignment
- Lack of traffic calming measures
- Significant grading concerns and possible retaining wall(s) required

#### Existing Alignment with Signage Improvements – Recommended Alternative

All of the alternative alignments evaluated suffered from two common problems. First, they cost significant amounts to construct, but are not designed to address a particular safety concern. Second, and possibly more importantly, all of the re-alignment options would cause other potential safety issues by improving one area while negatively impacting the steep grades, or alignment of another. Because of these problems, minor modifications to approaches and signage at the intersection were considered.

There are several positive outcomes associated with this alignment, which include:

- Slightly less confusion
- Inexpensive
- Existing non-typical alignment provides traffic calming.

However, there are several negative outcomes associated with alignment, which include:

- Does not completely address perceived safety concerns. However, accident history does not support perception that intersection is unsafe in current condition
- Lack of added traffic calming measures without modification of approaches.

#### **Traffic Calming - Route 82 from Ray Hill Road to Route 149:**

Traffic calming measures were evaluated for this segment of Route 82 to address the deficiencies as described in the existing roadway conditions segment of this report. The objectives for traffic calming along Route 82 include the following:

- Reduce vehicle speeds entering the Village;
- Create a “sense of arrival” as you enter the Village;
- Improve pedestrian crossings

- Reduce confusion of the Route 82 / Route 149 intersection.

The following traffic calming measures are recommended for this Area, and are depicted in the Figure of the recommended option.

- Retain existing intersection, but re-stripe and install new signs. Install new island to separate parking at the package store from Route 82, and reduce the pavement width to slow traffic. Textured crosswalk at Creamery Road.
- Install a pedestrian crossing with a different pavement texture. Plantings and signage will be incorporated at this crossing to create the “sense of arrival” to the Village and encourage slower traffic. Install new sidewalks along Route 82.

### **Traffic Calming - Route 149 from Landing Hill Road to Route 82**

Traffic calming measures were evaluated for this segment of Route 149 to address the deficiencies as described in the existing roadway conditions segment of this report. The objectives for traffic calming along Route 149 include the following:

- Create a “sense of arrival” westbound as you enter the Village
- Improve pedestrian crossings
- Reduce confusion of the Route 82 / Route 149 intersection

The following traffic calming measures are recommended for this Area, and are depicted in the Figure of the recommended option.

- Retain existing intersection, but re-stripe and install new signs. Install crosswalks on Route 149 north of Route 82 triangle. Install new sidewalks along Route 149.
- Install a pedestrian crossing with a different pavement texture. Plantings and signage will be incorporated at this crossing to create the “sense of arrival” to the Village and encourage slower traffic. Install new sidewalks along Route 149.

### 5.2.2 Potential Development Sites

The design team considered potential development sites as those sites that could support development through:

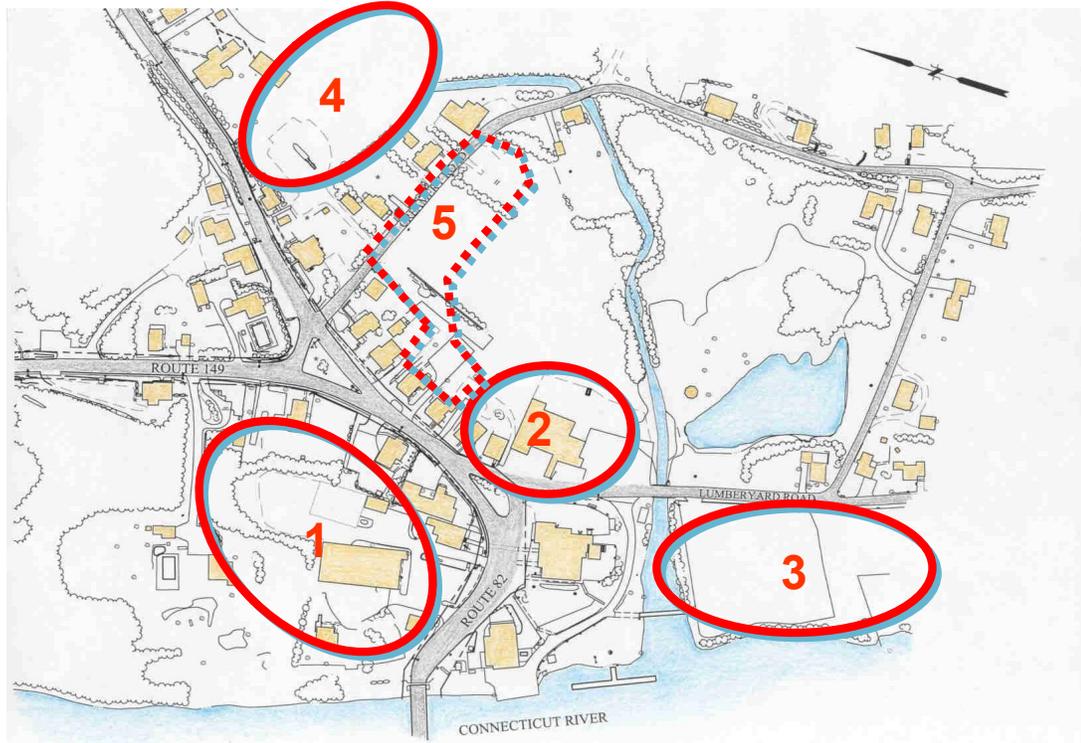
- Re-development, including:
  - Property containing the town offices and parking
  - Former Williams Chevrolet property
  - Goodspeed parking west of Lumberyard Road
- New development of building and/or parking, including:
  - Goodspeed property north of Creamery Road
- New development of parking, including:
  - Goodspeed property south of Creamery Road

In all areas, when buildings are depicted in various graphic figure prepared by the Design Team, the intent is only to show an approximate total floor space available for development. It was not the intent of the Design Team to depict building footprints which represented actual buildings to be constructed. Multiple buildings, or single buildings of very different

shapes, could ultimately be constructed on the development sites. It is important that the scope, size, and architecture of the buildings matches and enhances the existing historical nature of the Village Area.

Although the footprint used for the new Goodspeed Theater was based on conceptual plans prepared by SmithEdwards Architects for Goodspeed Musicals, it does not necessarily represent a final configuration, location, or overall plan for the building that may someday be constructed. This building, like all others depicted by the design team are only for general reference and to allow a basis for estimating property and parking needs.

These areas are graphically depicted in the following figure:



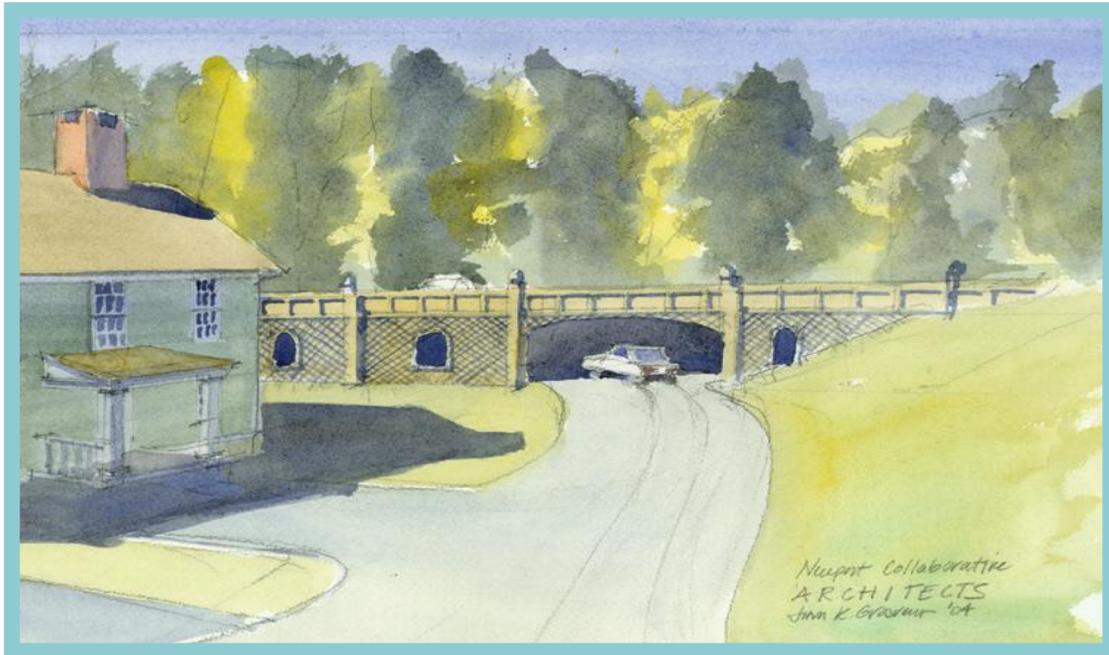
### 1- Property Containing the Town Offices And Parking

This property would be very attractive for redevelopment for mixed use since it has a prominent location in the Village, is close to Gelston House and the Goodspeed Theater, and has views of the Connecticut River. The existing grades and configuration of the property would allow the construction of a multiple level parking structure without negatively impacting the aesthetic qualities of the Village Area.

Two versions of potential redevelopment of this area were considered. Both included the potential for a building, or multiple buildings totally approximately 20,000 square feet. In one option, surface parking would be located north of the building area, while in the other

option, a multiple level (surface plus two decks) parking structure would be north of the buildings.

Because of the grade differences on the site, an entrance to the parking structure from Route 149 would be to the middle level. The structure would be mostly hidden from view by building in all locations except from Broom Street and from Route 149, just north of the Route 149/Route 82 intersection. An artistic rendering of what this structure might look as viewed from Route 149 is shown in the following figure:



## 2 - Former Williams Chevrolet Property

This is the proposed site of the new Goodspeed Theater. In the mixed use development option, the site could support a combination of mixed use buildings with adjacent parking.

## 3 - Goodspeed Parking West of Lumberyard Road

The existing parking in this area consists of both paved parking and overflow parking areas on grass. The area also contains the existing Town boat launch area and very limited access to the Connecticut River.

Previous geotechnical studies have indicated that any structure, including buildings or multiple level parking structures would have to be supported on piles and also would have to comply with regulatory constraints for floodplains.

The Design Team concluded that the best redevelopment opportunity for this area was to reconfigure the paved parking to provide an increased amount of parking adjacent to the

Goodspeed while also creating a linear park area adjacent to the Connecticut River. This redevelopment would allow the existing boat launch to remain, or would allow modification and improvement of the boat launch and the addition of a staging and loading area for smaller craft, such as canoes and kayaks.

This redevelopment scheme demonstrates the balance of competing goals. The expansion of the parking requires additional pavement, but the reconfiguration would provide better public access to the river and a linear park as a buffer between the parking the river.

This alternative is depicted in the following figure:



#### 4 - Goodspeed Property North of Creamery Road

Although slightly north of the Village Area, this property has potential as a development site. Goodspeed considers it a potential site for actor housing, if they move forward with expansion plans in East Haddam. If they were to leave East Haddam, the site would make an attractive mixed use site, although it would likely be developed after the Village Area since it is further from the heart of the redevelopment area.

If redeveloped for mixed use, the site development would be best served if the parking needs for the site were met on site. Because of its separation from the Village Area, it is not an ideal site for shared parking. However, in a development including a new theater, the site could be used for employee and overflow parking and therefore could accommodate shared parking.

## 5 - Goodspeed Property South of Creamery Road

This property was formerly the site of houses and barns, however, all the existing structures have burned, or been removed. The area is within the flood plain, as well as the State Regulated Wetlands. Therefore, development of the site is expected to be limited.

It is unlikely that significant buildings (other than small residential structures) would be developed on the site based on the regulatory and physical constraints. The site could be used for parking in either a mixed use development (as peak use overflow parking) or for new theater development.

The number of spaces reasonably available in the area is approximately the same number that could be created by constructing two parking decks over the surface parking at the Town Office Site. Therefore, these two concepts can be seen as alternative parking strategies. The cost of a parking structure would have to be balanced against the potential impacts and mitigation requirements of construction of a parking lot in the regulated wetland area.

### 5.3 Parking

#### 5.3.1 Parking Needs

The parking needs of the two development scenarios are not very different since both plans are based on development/redevelopment of the same areas. The main difference is a phased plan could be implemented in an “as-needed” basis with the mixed use alternative. The parking needs of different uses tend to balance on a site in a similar way. For example, on a site of a given size, a more parking intensive use, for example retail, would result in less square footage of building and more of parking while a less parking intensive use, for example residential apartments, might use multiple story structures and thus increase the square footage of building to match the available parking. The balance point between parking and building size tends to result in similar parking needs in a full build out analysis for most development types.

The approximate square footage of development (and number of residential units) were developed based on the available land area and parking requirements and were used to determine the approximate balance point between building area and parking area requirements.

Parking requirements were not based on Town of East Haddam Zoning Regulations. The parking requirements were based on several sources including, “Parking Generation, 2<sup>nd</sup> Edition”, published by the Institute of Transportation Engineers, and the judgment and experience of the design team.

Based on the anticipated hours of operation of the existing and proposed theaters, the parking lot survey indicated that up to 70% of the existing mixed use parking could be

counted as shared parking. This shared parking rate was only applied to the commercial uses since residential parking would not be available for shared parking during theater parking peak demands. The concept of shared parking maximizes the use of the available parking spaces when the associated uses are opposites. For example, shared parking is seen when there is office development accompanied with residential development.

Mixed Use Development Plan

There are three major components of parking needs for the mixed use development plan which can be summarized as:

Existing Mixed Use	70 parking spaces
Existing Goodspeed	165 parking spaces
<u>New Mixed Use</u>	<u>328 parking spaces</u>
Total Required	563 parking spaces

The “Existing Mixed Use” parking requirement is based on the parking lot survey conducted by the Design Team for this project.

The “Existing Goodspeed” parking requirement is based on a 2.4 passengers per vehicle. This number is based on national standards, prior studies conducted by the Goodspeed’s consultant team, and the engineering judgment of the design team.

The “New Mixed Use” parking requirements are a composite of the development and redevelopment of sites within the Village Area, as follows:

- Town Office Property:
  - 20,000 square feet (SF) of retail at 3.5 parking spaces per 1,000 SF, resulting in 70 spaces
  - 20 apartments at 1.5 parking spaces per apartment resulting in 30 spaces
- Former Williams Chevrolet Property
  - 25,000 SF retail at 3.5 spaces per 1,000 SF = 87 spaces
  - 55 apartments at 1.5 parking spaces per apartment = 83 spaces
- Goodspeed Property North of Creamery Road
  - 8,000 SF retail at 3.5 spaces per 1,000 SF = 28 spaces
  - 20 apartments at 1.5 parking spaces per apartment = 30 spaces

Goodspeed Expansion within the Village

There are four major components of parking needs for the Goodspeed expansion plan which can be summarized as:

Existing Mixed Use	70 parking spaces
Existing Goodspeed	165 parking spaces
New 700 Seat Theater	292 parking spaces
<u>New Mixed Use</u>	<u>50 parking spaces</u>
Total Required	577 parking spaces

The “Existing Mixed Use” parking requirement is based on the parking lot survey conducted by the design team for this project.

The “Existing Goodspeed” and “New 700 Seat Theater” parking requirements are based on a 2.4 passengers per vehicle. This number is based on national standards, prior studies conducted by the Goodspeed’s consultant team, and the engineering judgment of the design team.

The “New Mixed Use” parking requirements are a composite of the development and redevelopment of sites within the Village Area, as follows:

- Town Office Property:
  - 20,000 square feet (SF) of retail at 3.5 parking spaces per 1,000 SF, resulting in 70 spaces. However this number must be modified based on the shared parking ratio of 2 parking spaces per 1,000 SF used for the existing mixed use needs (based on parking lot survey data). This results in a need for 20 spaces.
  - 20 apartments at 1.5 parking spaces per apartment resulting in 30 spaces

### 5.3.2 Potential Parking Available

Both the mixed use and new theater development plans have approximately 590 to 600 parking spaces available. For a planning level study, such as this one, the available parking appears sufficient based on the needs calculated above. It should be noted that the alternative parking garage structure could take the place of the parking south of Creamery Road and provide essentially the same net parking spaces.

Remote parking opportunities were considered for both development scenarios. The largest potential opportunity for remote (off-site) parking is the large parking area previously used by Camelot Cruises on the Haddam side of the river. However, this parking was not considered a feasible option for a variety of reasons.

The land is expected to be purchased by the State of Connecticut DEP and it may not be available for parking in the future. In addition to this fact there are financial and operational considerations.

Relative to a mixed use development, the existing (and even proposed full build out) density of the Village Area would not justify the cost of a shuttle or bus service. Although members of the public mentioned ideas like water taxis, it is not likely that the Village Area could support this type of investment.

Pedestrian access across the swing bridge would require the addition of sidewalks, which DOT currently opposes based on structural consideration and the historic nature of the bridge. The distance between the potential parking and the Village Area, and the exposure in inclement weather would also have a negative impact on the potential for use.

In regard to a plan including a new theater, the same problems would exist. In addition to these obstacles, the operational characteristics of the theater would make it even more difficult to use remote, off-site, parking.

Michael Price, Executive Director of Goodspeed Musicals, summarizes in a letter dated April 20, 2004, to Bradley Parker, First Selectman of East Haddam, that the “Goodspeed’s Board of Trustees will not approve the investment in a multi-million facility which has remote parking and shuttle service as a part of its parking plan” because of the substantial costs, operational/logistical concerns , and patron comfort.

#### 5.4 Pedestrian Access

The pedestrian access within, as well as to and from the Village Area, is proposed to be of two types. There will be “formal” sidewalk areas which are primarily proposed along existing roadways along the main thoroughfares, and “informal” walking areas in more natural settings.

##### Formal Sidewalks

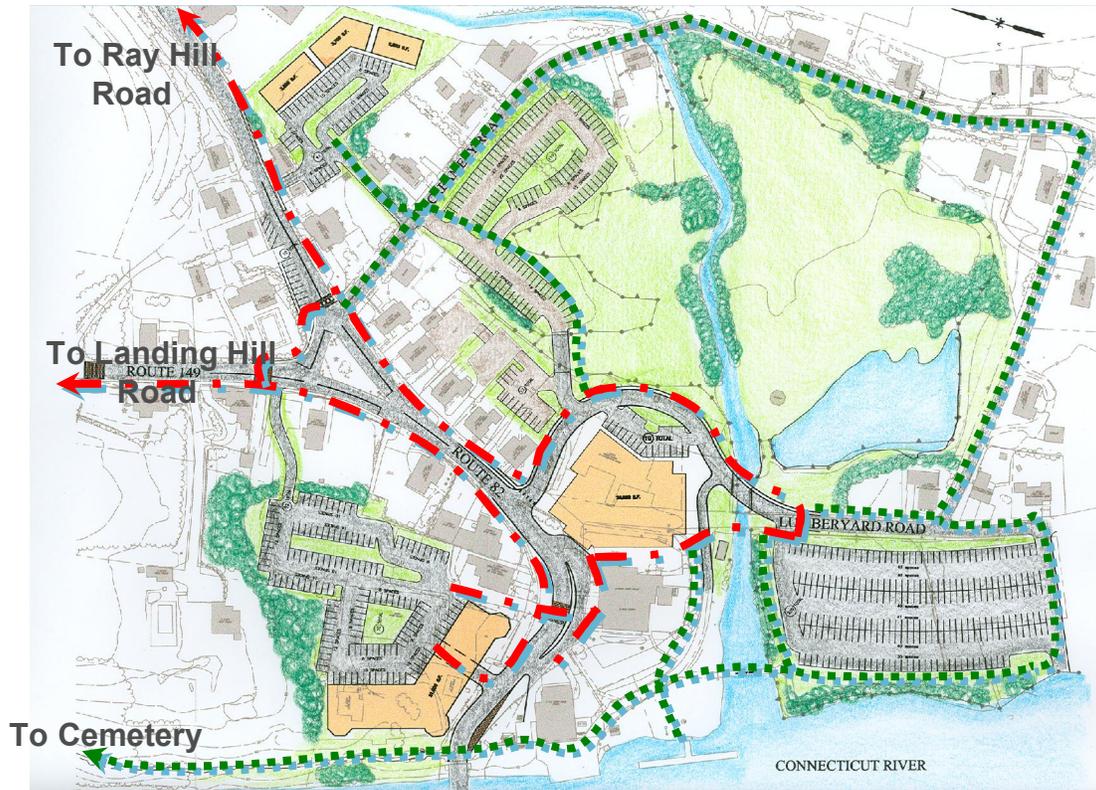
The formal sidewalks would be predominantly along Route 82 and Route 149. The proposed layout of the sidewalks is depicted in Appendix M. In general, the walks would be 4’ to 5’ wide (most existing sidewalks in the Village Area are 4’ wide) and made of Portland cement concrete. Architecturally pigmented and textured concrete or other options could be used to create a better sense of place.

As depicted on the layout plans, most of the sidewalks would fit within the existing right of way. Unfortunately, this results in most of the walks being directly behind the curb rather than offset with a snow shelf. One area along Route 82 would require significant re-grading, retaining wall, and likely some minor property acquisitions. Most of the walk along Route 149 would be on the western side of the road and limited to walks on a single side of the road based on topographic and right of way constraints.

##### Informal Walks

The less formal pedestrian ways would include a proposed river walk from the Goodspeed parking lot to the cemetery owned by the Sons of the American Revolution and the site of the Nathan Hale School House. Other informal, but important pedestrian ways include Creamery Road itself, and a proposed walkway from Lumberyard Road through Rotary Park to Creamery Road.

The following figure depicts the proposed pedestrian access ways with the formal depicted in red and the informal in green:



In October, 1999, Lichtenstein and Associates, Inc. prepared a sidewalk study report ([Appendix N](#)) which concluded that it was feasible to install cantilevered sidewalks with a bike lane on the existing swing bridge across the Connecticut River.

However, ConnDOT has stated that it will not endorse adding a pedestrian walkway on the swing bridge that would require structural work. The bridge is old, historic and has a history of mechanical problems. Its operation may be sensitive to structural changes that a pedestrian walkway would require.

Although there is limited need for this connection at this time based on existing development on the Haddam side of the river, this option should be considered in future master planning when pedestrian connection of the two sides can be financially justified, and DOT concerns can be addressed through additional engineering considerations.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

### 6.1 General

In general the study indicates that mobility improvements are available that satisfy the long range development scenarios considered during the study process. In addition, parking concerns can be adequately addressed through full build out under either development scenario considered with subsequent Town policy change and regulatory support.

The balance between various factors of consideration and evaluation criteria must be further developed as the design progresses in future phases of the project. Most notably, questions concerning the balance between wetland impacts (approximately 2.5 acres of disturbance) related to the proposed Creamery Road Parking Lot versus the cost, operational, and aesthetic concerns of the potential multiple level parking structure on the Town Office site must be resolved.

The design team was unable to address some of the concerns of the stakeholders. Two of the most significant items that were not resolved are the pick-up of patrons in front of the existing Goodspeed Theater, and the use of “small, dispersed, interconnected” parking areas to provide the required additional parking.

The limitation of road geometry, existing structures, and physical amount of space available does not allow for a properly designed pick-up area in front of the existing Goodspeed Theater. Clarification of the drop-off, improvements in sight line distances, and better definition of pedestrian and vehicular areas in this area have been addressed. If the Goodspeed expansion occurs, an alternate pick-up and drop-off method in the rear of the complex may be a consideration.

The six project guidelines contained in the document entitled, “A Vision for East Haddam Village”, prepared previously by several community groups have been considered and addressed in the study except for the goal of providing additional parking in “small, dispersed, interconnected” areas. Based on the parking needs related to full build out of either development scenario, sufficient parking cannot be provided in the limited areas within the Village Area without the use of large contiguous lots.

The design team recommends that the proposed lots be designed using exterior (and interior where appropriate) landscaping and curved layouts to break-up the views into the parking fields. This can provide the elusion of smaller lot size while still meeting the requirements of the parking needs. However, this is another example of the “tension” that exists in the balance between various factors of consideration and evaluation criteria. The question of appropriate level of development is inexorably linked to the size and amount of parking required.

## 6.2 Current Working Plans of Recommended Scenarios

The following figures graphically depict the working plans for both development scenarios:

### Mixed Use Working Plan:



### New Theater Working Plan



### 6.3 Construction Phasing

The new theater development plan would not allow phasing of parking areas since all parking would be required when the theater is opened.

However, the mixed use plan would not be likely to be developed all at a single time. It is difficult to predict which areas would be developed first, but one possible scenario would be as follows:

- Redevelopment of the Town Office Property with parking needs met on site.
- Redevelopment of the Former Williams Chevrolet site in three subphases:
  - Approximately 20 to 40% of development with parking needs met on site
  - Approximately 10 to 15% more of the total development with redevelopment of the Goodspeed Parking Lot to provide additional shared spaces
  - Full build-out in conjunction with either the development of the parking lot south of Creamery Road, or construction of a multiple level parking structure on the Town Office Site
- Development of the Goodspeed property north of Creamery Road with on-site parking and potentially some shared parking depending on uses.

### 6.4 Potential Impacts

#### 6.4.1 Wetlands

There are three potential wetland disturbances proposed in the recommended plans:

1. New Crossing of the Succor Brook for Lumberyard Road Realignment
2. Crossing of federally regulated wetland and disturbance of state regulated wetlands to access Creamery Road Parking Lot from Lumberyard Road
3. Disturbance of the state regulated wetland to construct a parking lot south of Creamery Road and modify the existing Goodspeed parking lot adjacent to the river.

Of these potential disturbances, only Items 2 and 3 would be likely to require mitigation. Item 1 would result in only temporary disturbances and is intended to correct an existing substandard condition involving scour and barriers to fish passage presented by the existing culvert. The design of the new culvert/bridge should minimize disturbance to the Succor Brook.

Mitigation for Items 2 and 3 would be dependant on final areas of proposed disturbance. The current conceptual plans depict the following potential disturbances of State Regulated Wetlands:

- Parking Lot south of Creamery Road – approximately 53,700 square feet
- Realigned Lumberyard Road & Parking – approximately 19,000 square feet
- Riverside Parking & Boat Launch – approximately 37,800 square feet

On site mitigation could take the form of enhancement of the remaining, higher quality, wetland areas and removal of invasive species. Preservation of the remaining wetlands could also be proposed by conveying title to the Town or an acceptable land trust. If necessary, off site mitigation could be pursued.

The potential impacts to federally regulated wetlands depicted on the current conceptual plans are limited to temporary disturbances and secondary impacts related to the construction of bridges spanning the wetland areas and removal of the existing box culvert in Succor Brook. Therefore, no mitigation requirements are anticipated for federal wetland impacts.

#### 6.4.2 Archeological

The proposed concept plan will affect East Haddam Town Lots 8, 10, 14, 15, 19, 49, 55, 56, 57, 62, and 63 located on the Town of East Haddam Property Map #17. In May 2002, a "Phase 1A Archeological Assessment Survey of the Goodspeed Opera House Expansion in East Haddam, Connecticut" was prepared by Lucianne Lavin, Ph.D. This report has identified that all of the lots show a moderate to high sensitivity to both prehistoric Native American archaeology sites and 18-19<sup>th</sup> century historic archaeology sites. Lot 10, the Gelston House property, is also sensitive for late 17<sup>th</sup> century cultural remains. However, lots 10 and 56 exhibit extensive soils disturbance as a result of residential and/or industrial construction, destruction, and reconstruction activities that would have seriously affected the integrity any archaeological sites that may have been located in those areas.

#### 6.4.3 Historical

The proposed concept plan lies within the National Register-listed East Haddam Historic District. This district includes a dense concentration of 18<sup>th</sup> and 19<sup>th</sup> century dwellings and commercial structures. Most, but not all, of the listed district is also a local historic district. The major distinction between the two districts is that the local historic district does not extend southward on Lumberyard Road. In addition, the Swing Bridge is identified in the state's historic bridge inventory as a National Register-eligible structure and the Goodspeed Opera House is also listed on the National Register. The proposed concept plan will affect existing historic structures located in Lots 14 and 55 of the Town of East Haddam Property Map #17. Any proposed development of these areas are required to follow NEPA requirements. An evaluation of the historic districts is noted in the "Environmental Impact Evaluation and Conceptual Master Plan" developed by the Maguire Group, Inc. in January 2001.

#### 6.4.4 Rights Of Way (ROW)

The proposed concept plan affects several areas that will require takings or easements. The following is a list of properties that are potentially affected by the proposed sidewalks along

Route 82: Lot 40, 47, 49, and 54 located on the Town of East Haddam Property Map #17. The following is a list of properties that will be affected by the proposed realignment of Lumberyard Road: Lot 55, 56, 57, and 57-2 located on the Town of East Haddam Property Map #17. All listed parcel takings and/or easements are subject to change depending on the final design plans.

## 6.5 Suggested Regulatory Framework

The planning and design process used to formulate the development scenarios for the East Haddam Mobility Improvement Project provide a detailed analysis of what future development could be. This applies to both the possible expansion of the Goodspeed facilities or a larger mixed-use core in the Village center. Seeing the size of the buildings, their potential uses, and the required parking areas should make residents and decision-makers think about the future of the historic Village. More than this, the potential build-out should motivate leaders and active citizens to arrive at a shared vision and then implement the necessary regulations to make the vision a reality.

Before crafting any regulations, the East Haddam community must make a decisive policy decision that having a dense, vibrant, mixed-use core is the community goal. Only after this policy statement is approved can the elected officials and regulators craft regulations that allow this vision to be implemented. Currently, East Haddam has a Zoning Study Group which is looking at the issue of amendments to the Town Zoning Ordinance, however, there is no policy statement in place that states the actual preferred density of mixed-use development.

If the community and its elected officials make a statement that development of higher density mixed-use parcels in the Village center is appropriate, then it is suggested that the Town adopt very specific zoning language for each development parcel in the historic Village Area.

For instance, the current site of the Town Hall Annex and Town maintenance garage should have specific zoning performance standards that require:

- Building envelope held to the sidewalk line on the south side of the parcel
- Retail or commercial uses on the first floor levels
- Total maximum lot coverage by building of 70%
- Maximum building height of 35' from the existing sidewalk elevation
- Parking accommodated on site and screened from the public right of way
- Dedication of a publicly accessible walkway on the west side of the parcel (to connect to a future informal pedestrian path connecting Route 82 with the Nathan Hale Schoolhouse)

In addition, zoning for this parcel should encourage the following:

- Residential use on the upper floors of the building
- Architectural design compatible with the historic character of the Village center
- Architectural design of the building's south and west facades that recognizes the gateway nature of the building(s)

- Development of a privately maintained greenspace across from the Gelston House to facilitate connections between on-site parking and other Village attractions

Such detailed design guidelines are needed for each of the key development parcels identified in this report. Existing historic buildings and sites are currently regulated by the East Haddam Historic District Commission under existing zoning provisions.

## 6.6 Sustainable Design Methodology

Sustainable, or environmentally compatible, design seeks to balance the needs of the human community with those of nature. By emulating natural solutions to problems, the intent is to find greater harmony between the built and natural environment, while still providing for the needs to the community.

The Brundtland Commission provided the definition of sustainable design in 1983, as, “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

The current definition accepted by the American Institute of Architects is, “The ability of society to continue to function without being forced into decline through exhaustion or overloading of the key resource on which the system depends.”

The design of the East Haddam Mobility Improvement Project supports and encourages sustainable design principals and uses the following four step process in the design of parking and other impervious surfaces:

- Step 1: Determine need for parking
  - Work with regulators
  - Consider the frequency and timing of peak events
  - Encourage pedestrian access
  - Consider mass transit
- Step 2: Identify alternative parking opportunities
  - Evaluate existing pavements and parking
  - Consider shared parking opportunities
  - Consider “found” parking
- Step 3: Minimize impervious pavement areas.
  - Evaluate primary and overflow parking requirements.
  - Design efficient lots.
  - Consider pervious alternatives.
    - Natural types (i.e. gravel or grass).
    - Modified pavements.
      - Pervious bituminous mixes.
      - Pervious pavers.
    - Alternative structural matrixes.
      - Concrete matrix.
      - Plastic matrix.
      - Root zone reinforcing fibers.

- Step 4: Design “natural” sustainable stormwater systems
  - Stormwater treatment
    - Provide detention to minimize energy, allow sediments to settle, and minimize impacts to downstream peak flows
    - Use bio filtration to remove sediments
    - Use created wetlands for water polishing and removal of potentially harmful materials
    - Use swirl concentrators or other “structural” alternatives where more natural solutions are not feasible

The applicability of this methodology and the sustainability of the overall design should be considered in future phases of the project. During the concept phase, alternatives have been developed with the intent of not precluding the use of sustainable design guidelines. However, it should be noted that these principles must be applied during design.

## 6.7 Regulatory Permits

At further stages in the design process, specific federal, state, and local permits will be required and regulations will apply.

- The Army Corps of Engineers (ACOE) has jurisdiction over the discharge of dredged and fill materials into open water and federally regulated wetlands, thus an ACOE Permit may be required. There are three levels of permit, Category I – Nationwide General Permit, Category II – Programmatic General Permit, and Category III – Individual Permit. The permit requirements are based on total area of primary and secondary impacts.
- The National Historical Preservation has jurisdiction of areas within the project area, requiring compliance with regulations set forth in the Historic Preservation Act.
- The Department of Environmental Protection (DEP) regulates direct and nonpoint source discharge, requiring Construction Stormwater Discharge Permits as well as potentially Commercial Stormwater Discharge Permits
- The Inland Wetlands and Watercourses are regulated by the State with jurisdiction delegated to the local Inland Wetlands Commission. Disturbances within State regulated wetlands, or associated Upland Review Areas would require permits.
- The Clean Water Act requires the water quality of state water bodies not be compromised in anyway, thus requiring Water Quality Certification by the DEP.
- The Office of Long Island Sound Programs (OLISP) has jurisdiction tidally influences bodies of water, thus requiring a Tidal Wetlands Permit if there is any disturbance within the tidal wetland areas.
- The State Traffic Commission (STC) requires all major developments (100,000 square feet or 200 parking spaces) along a state road to file for a STC Application for Major Traffic Generator Certificate.
- All proposed developments must meet DEP regulations involving development in a 100-year flood boundary.
- The proposed development must meet guidelines and regulations set forth in the Conservation and Development Policies Plan for Connecticut.

- Town Zoning Regulations will apply to the project area, requiring changes in zoning (or variances) and town permits.

6.8 Estimated Opinions of Cost

The construction cost of the development scenarios must be considered in the evaluation of alternatives as well as the planning and phasing of development. The following opinions of cost were prepared by the design team to aid in the decision making process.

	Estimated Construction Cost*
Roadway Improvements	
Town Center	\$625,000
Lumberyard Road	\$550,000
 Pedestrian and Traffic Calming	
Sidewalks and Calming on Rt 149	\$340,000
Sidewalks and Calming on Rt 82	\$185,000
 Parking Improvements	
Town Hall Surface Lot	\$560,000
Goodspeed Surface Lot	\$775,000
Creamery Road Surface Lot	\$1,650,000
North Surface Lot	\$255,000
 River Access and Pedestrian Improvements	
Linear Park / River Walk	\$560,000
 Off-Site (Haddam) Improvements	
Rt 9 Connector at Middlesex Turnpike	\$100,000
Bridge Road at Middlesex Turnpike	\$160,000
 <b>TOTAL CONSTRUCTION COST</b>	<b>\$5,760,000</b>
 Alternative Improvements	
Parking Structure	\$3,800,000
Placing Utilities Underground	\$400,000

\* Detailed Estimated Opinion of Costs (Appendix O)

It should be noted that these numbers have been provided for planning purposes and since the design team has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, the opinion of probable Total Project Costs & Construction Cost are made on the basis of the design team's experience and qualifications and represent their best judgment as an experienced and qualified design professionals, familiar with the construction industry; but the design team cannot, and does not, guarantee that proposals, bids or actual Total Project or Construction Costs will not vary from the opinions of probable cost.

#### 6.9 Next Steps

As previously stated, the "conclusion" of this phase of the project is really the beginning of the design phase and, therefore, does not represent a "final" plan. The Stakeholders must now use the information contained in this report to decide if and how to proceed with future design phases.

The Town must identify funding sources and then select and prioritize improvements that can be designed and built within the available funding. Enabling zoning regulations may have to be developed and approved to support and allow the development alternatives chosen by the Town.

Several of the mobility improvements related to the roadways are largely independent of the development scenario selected and therefore would be good starting points for the design, permitting, and construction phases. The Stakeholders will have to decide which parts of the plan should proceed prior to a final decision concerning whether or not the expansion of the Goodspeed Theater complex will proceed within the Village of East Haddam.