TRANSPORTATION

PROJECT REPORT

FINAL DESIGN REPORT (Volume 1 of 2)

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COUNTY ROUTE 119
CODDINGTON ROAD
DANBY TOWN LINE TO
CITY OF ITHACA LINE

PIN 3753.24

TOWN OF ITHACA
TOMPKINS COUNTY, NEW YORK

AUGUST 2007

UNITED STATES
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

REG 97-1 (190)

METRIC CONVERSION TABLE

Length:

1 meter	=	3.281 feet
1 meter	=	39.370 inches
1 foot	=	0.3048 meters
1 foot	=	304.8 mm
1 inch	=	25.4 mm
1 km	=	0.621 mi
1 mile	=	1.609 km

Area:

1 m^2	=	10.764 ft^2
1 ft^2	=	0.0929 m^2
1 Acre	=	0.40469 hectare (ha)
1 hectare	=	2.47105 Acre

Volume:

1 m^3	=	35.315 ft^3
1 ft^3	=	0.0283 m^3

Mass:

1 ton (U.S.)	=	2000 lb
1 ton (U.S.)	=	0.907 ton (Metric)
1 ton (Metric)	=	1.102 ton (U.S.)
1 ton (Metric)	=	1000 kg
1 ton (Metric)	=	0.102 kN

Force:

1 newton	=	0.2248 lb
1 kN	=	224.8 lb
1 lb	=	4.448 newtons
1 kip	=	1000 lb
1 kip	=	4.448 kN

Speed:

1 mph	=	1.609 kph
1 kph	=	0.621 mph

Flow:

1 m^3/s	=	35.315 ft^3/s
1 ft^3/s	=	0.0283 m^3/s

CHAPTER I

INTRODUCTION

FINAL DESIGN REPORT

CODDINGTON ROAD
(COUNTY ROUTE 119)

DANBY TOWN LINE TO CITY OF ITHACA LINE

TOWN OF ITHACA
TOMPKINS COUNTY, NEW YORK

NYSDOT PIN 3753.24

AUGUST 2007

1 INTRODUCTION

This project proposes to improve a portion of Coddington Road in Tompkins County. The project encompasses approximately 5.0 kilometers (3.1 miles) of Coddington Road, in the Town of Ithaca, New York between the Town of Ithaca / Danby line and the City of Ithaca line. The proposed work will include reconstruction of the existing pavement utilizing asphalt recycling techniques that allow the existing asphalt to be ground up and used as subbase material. Other improvements will include minor widening of travel lanes, installation of pedestrian and bicycle facilities such as providing paved shoulders and sidewalks (in some areas) and improving drainage facilities. The proposed roadway will be constructed, for the most part, along its existing alignment. The proposed horizontal alignment may be shifted slightly to one side or another at some point(s) to better fit the widened road section to the existing topography. The proposed vertical alignment will be only altered as necessary to improve sight distance and coincide with any horizontal re-alignments. The proposed work will be funded with federal, state, and local monies. The project is being progressed as a Class II action, under USDOT Regulations: 23 CFR 771 and a Type II project under the State Environmental Quality Review Act (SEQR). The Tompkins County Highway Superintendent will grant Design Approval. The project is scheduled to be let in February of 2008.

The purpose of this Final Design Report is to identify the project needs, determine the scope of the proposed improvements which will enhance the safety, ridability and service life of Coddington Road. The Project Design Alternatives are presented in this report along with a cost estimate for each alternative.

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CHAPTER II

PROJECT INDENTIFICATION, EVOLUTION, CONDITIONS & NEEDS AND OBJECTIVES

FINAL DESIGN REPORT

CODDINGTON ROAD
(COUNTY ROUTE 119)

DANBY TOWN LINE TO CITY OF ITHACA LINE

TOWN OF ITHACA
TOMPKINS COUNTY, NEW YORK

NYSDOT PIN 3753.24

AUGUST 2007

II. PROJECT IDENTIFICATION, EVOLUTION, CONDITIONS & NEEDS AND OBJECTIVES

A. Project Identification

1. Project Type: Road Rehabilitation/Reconstruction

2. Project Location

a. This section of Coddington Road is located in the Town of Ithaca in Tompkins County, New York between the City of Ithaca line and the Town of Ithaca / Danby line.

b. A regional and project location map can be found in *Appendix A*.

B. Project Evolution

In response to safety concerns accompanying multi-modal traffic growth, several intersections and general road sections with non-standard sight distances, deteriorating pavement conditions and insufficient drainage facilities, Tompkins County identified Coddington Road as a candidate for reconstruction in 1998. In fact the County Highway Manager stated in a letter to NYSDOT that "the Coddington Road project has the highest County priority of all the eligible projects." In 1999 NYSDOT Region 3 approved an Initial Project Proposal (IPP) created by the County Public Works Department for reconstruction of Coddington Road from the City of Ithaca municipal boundary to the intersection of German Cross Road in the Town of Danby. Subsequently, the Ithaca-Tompkins County Transportation Council added the project to the Transportation Improvement Program (TIP).

In 2000, however, the project's priority was challenged when faced by a lack of funding for other, ongoing projects. Given the need for TIP fiscal constraint, a new prioritization resulted in redirection of funds for Coddington Road construction to these other needs via a TIP amendment. Since the needs on Coddington remained, project design remained on the TIP and the County submitted a revised IPP later that same year to restore the construction funding. This, too, was approved, but with slightly reduced project limits – from the Ithaca city line to the Ithaca-Danby town line. Full funding was restored to the TIP in 2001.

However in the fall of 2001, when the scheduled project initiation date had passed without scoping having started, NYSDOT suddenly withdrew design funding. A second TIP amendment was advanced and approved at the end of 2001 restoring these funds. The amended TIP called for scoping to begin in October 2004 with letting and construction in the spring of 2006. Since scoping was delayed, starting in February of 2005, and the preliminary design phase has resulted in a more extensive effort that originally anticipated the letting has been postponed as well. Letting will likely now occur in February of 2008.

C. Conditions and Needs

1. Transportation Conditions, Deficiencies and Engineering Considerations B

a. Functional Classification

Coddington Road is divided into two Functional Classifications:

1. From the City of Ithaca Line to Burns Road, Coddington Road is an Urban Collector.
2. South of Burns Road, Coddington Road is a Rural Major Collector.

Coddington Road is a County Road and is not on the National Highway System.

b. Ownership and Maintenance Jurisdiction

Tompkins County owns and maintains Coddington Road including features such as the pavement, signs, and drainage features. Public utilities such as water and sewer are owned and maintained by the Town of Ithaca.

c. Culture, Terrain, and Climatic Conditions B

i. **Area Type**: Rural Residential in character. The northern portion of the project corridor contains a few residential subdivisions and a secondary entrance to Ithaca College. The southern portion consists mostly of rural residential strip development with some agricultural land use.

ii. **Terrain**: The terrain in the project area is moderately sloped, rolling hills.

iii. **Climatic Conditions**: Regional climatic condition is temperate continental with cold winters and mild summers.

d. Control of Access: The access along Coddington Road is unrestricted with several intersecting side streets and many private driveways. There are several houses along the northern section of the project which serve as privately owned student housing for Ithaca College. Many of these homes have small, shallow pull-off parking areas which provide perpendicular parking adjacent to the Coddington Road pavement section. These parking areas are typically in violation of Town code but they pre-exist the Town Ordinance and are grandfathered by the Town. These spaces are considered non-standard features because of possible safety issues with cars backing out into traffic. However the public expressed strong opposition to eliminating them during earlier Alternative design and there is little accident data that suggests that they have been significant contributing factors to accidents in this area.

e. Existing Highway Section

(1) Right-of-Way –A review of the individual deed descriptions and the large number of existing property pins along the roadway (which identify the location of the individual property lines as well as the highway boundary) indicated that the highway boundary varies between 15.09 meters (49.5 feet) and 15.24 meters (50 feet) wide throughout the project limits. Many of the deed descriptions refer to a 15.24 meter (50 foot) wide Right-of-Way, while others refer to a 15.09 meter (49.5 foot) wide Right-of-Way. The existing roadway is generally centered within the existing highway boundary.

(2) Travel Lanes - The existing travel lanes along Coddington Road are approximately 3 meters (10 feet) wide with a paved surface width of approximately 6 meters (20 feet).

(3) Shoulders – The existing shoulders along Coddington Road are unpaved and their widths vary. T*able II-1* summarizes the existing shoulder widths).

Shoulder Widths					
Stations	Northbound Shoulder (meters)	Southbound Shoulder (meters)	Stations	Northbound Shoulder (meters)	Southbound Shoulder (meters)
1+000	2.1	1.8	3+300	0.8	1.2
1+160	0.9	1.2	3+440	1.0	1.2
1+500	1.3	1.3	3+500	1.4	1.2
1+570	0.9	1.2	3+930	1.1	1.2
1+770	0.8	1.2	4+000	1.2	1.6
2+000	1.2	1.4	4+050	0.8	1.2
2+500	1.2	1.0	4+500	1.5	1.2
2+560	1.2	0.6	4+570	0.9	1.5
2+620	0.7	1.2	4+870	0.6	1.5
2+790	1.9	0.9	5+000	1.3	1.3
2+980	1.4	1.2	5+190	1.0	1.5
3+010	*driveway*	0.8	5+240	0.9	1.4
3+050	0.7	1.2	5+500	2.3	1.2
3+090	1.8	0.8	5+600	0.9	1.4
3+140	0.5	1.3	5+750	*driveway*	0.7
3+180	0.7	0.4	5+785	0.9	0.9
3+210	0.9	0.8	5+930	1.2	1.0
3+250	1.0	1.2	5+980	1.1	1.3

Table II – 1 Shoulder Widths at Various Locations

(4) Curbing - There are no sections of Coddington Road within the project limits that are curbed. At the northerly project limit, Coddington Road intersects Hudson Street which is curbed within the City of Ithaca.

(5) Medians - There are no sections of Coddington Road within the project limits that contain a median.

(6) Grades and Curves - The existing vertical profile consists mainly of gentle to moderate slopes with portions of Coddington Road containing relatively flat grades. The horizontal alignment is generally straight stretches of road with a few slight horizontal curves deflecting the existing alignment. However, vertical sight distances are deficient at a number of locations. The following table summarizes the existing profile along Coddington Road.

PI Station	Grade (%)	Vertical Curve Length (m)	Sight Distance (m)		PI Station	Grade (%)	Vertical Curve Length (m)	Sight Distance (m)	
			Length	Meets				Length	Meets
1+000		N/A	N/A		2+964				
	-2.9					4.7			
1+035		40	217	yes	3+020		50	69	**no**
	-4.6					-2.8			
1+083		50	112	yes	3+111		100	Infinity	yes
	-1.7					-1.6			
1+145		60	289	yes	3+240		80	Infinity	yes
	-2.9					0.1			
1+405		60	464	yes	3+492		40	231	yes
	-0.9					-1.5			
1+462		30	88	**no**	3+563		40	155	yes
	-5.4					0.9			
1+518		50	41	**no**	3+670		80	185	yes
	2.4					-1.3			
1+578		40	80	**no**	3+956		100	725	yes
	-3.0					0.6			
1+628		50	115	yes	4+143		80	328	yes
	-0.1					-0.5			
1+701		40	78	**no**	4+482		40	105	yes
	-5.8					-4.4			
1+764		40	134	yes	4+607		40	81	**no**
	-8.7					-1.1			
1+851		120	52	**no**	4+713		40	120	yes
	4.7					1.6			
1+946		40	73	**no**	4+799		40	110	yes
	-1.5					-2.1			
2+060		100	213	yes	4+841		40	558	yes
	1.3					-0.1			
2+255		120	101	**no**	5+078		70	86	**no**
	-7.1					-6.6			
2+350		40	30	**no**	5+173		80	505	yes
	3.4					-4.6			
2+416		40	76	**no**	5+267		40	110	yes
	-2.6					-8.3			
2+506		100	Infinity	yes	5+452		260	164	yes
	-1.2					-1.6			
2+791		40	86	**no**	5+854		100	123	yes
	2.0					-6.1			
2+872		110	106	yes	5+970		40	227	yes
	-4.4					-3.8			
2+964		50	37	**no**	6+113		80	99	**no**
	4.7					-9.4			
3-020					6+180				

Table II – 2 Existing Vertical Sight Distances

(7) Intersection Geometry and Conditions: There are eleven intersecting side streets within the project limits. The following table summarizes the intersecting street geometry.

Side Street Name	Skew Angle with Coddington Road	Intersecting Grade at Coddington Road	Site Distance along Coddington Road at the Intersection meters (feet)
Updike Road	71°	+10.1%	52 (170)
Burns Road	*80°	-9.0%	30 (98)
East King Road	71°	+7.5%	76 (249)
Troy Road	40°	+5.6%	328 (1,076)
Rich Road	77°	+4.4%	105 (344)
West Northview Road	85°	+7.8%	81 (266)
Northview Road	85°	-2.2%	81 (266)
Juniper Drive	85°	-8.7%	505 (1,656)
Spruce Way	90°	+12.1%	110 (361)
Ithaca College-exit	80°	+7.7%	352 (1,150)
Ithaca College-enter	85°	+7.7%	352 (1,150)
Coddington Road	**20°	+1.7%	227 (745)
* - Average value measured along curvature ** - Wye intersection with Hudson Street			

Table II – 3 Existing Intersection Geometry

(8) Parking: Parking is prohibited along the shoulders of Coddington Road from the Ithaca College entrance to the Ithaca City Line. Shoulder parking is not prohibited along the remaining portion of the project, but the narrow shoulders do not promote safe and efficient parking and as a result there are few cars that park along the southerly sections of Coddington Road.

Many of the houses from the Ithaca College entrance to the north end of the project have small pull-off areas that serve as additional off street parking that is perpendicular to Coddington Road. These parking areas reduce the frequency of vehicles that would otherwise park along the narrow shoulders. Many of these areas are fairly shallow and vehicles are forced to park relatively close to the shoulder creating an unsafe situation with vehicles backing out into the roadway. The additional parking demand in this area results from a large percentage of rental houses serving Ithaca College. This type of student housing typically generates a higher than normal parking demand. As noted above, these shallow off street parking areas are typically in violation of Town code but in this area they pre-exist the Town Ordinance and are grandfathered by the Town.

(9) **Road Side** - There are drainage swales, ditches, sign posts and utility poles all along Coddington Road. In some locations there are private fences and/or hedge rows.

There are also many mature trees within 15 feet of the travel lanes. These trees have significant diameter and in many cases provide a natural Traffic Calming feature and serve as a barrier between the roadway and the homes along Coddington Road which are, in many cases, situated relatively close to the roadway. Careful consideration during the design process shall be given in an effort to preserve these trees.

f. Connecting Highway Segments and Future Plans for Connecting Highway Segments

Coddington Road has connections to adjacent highway segments from, Updike Road, Burns Road, East King Road, Troy Road and Hudson Street. There are also several residential roads allowing traffic from Coddington Road to enter subdivisions in the northern areas of the project. The rear entrance to Ithaca College is located at station 5+640.

There are no plans at this time to introduce any additional connecting highways/roads along Coddington Road, within the project limits. However some consideration was given to the potential re-alignment of Burns Road to produce a 4-way "Tee" intersection with East King Road. The current configuration includes two offset 3-way tee intersections with a 100 meter section of Coddington Road separating the two streets. This proposal would allow vehicles traveling along the East King – Burns Road corridor to avoid entering Coddington Road before continuing to travel east and west. Further discussion of this option can be found in *Section III-b* of this report.

Some consideration was given to the re-alignment of Hudson Street so that it produces a "tee" intersection with Coddington Road. This proposed configuration of the intersection includes the south approach of Coddington Road forming the through motion with the continuation of Coddington Road and the Hudson Street approach would be the stop condition. As currently configured, traffic along the southern leg of Coddington Road-Hudson Street creates the dominant maneuver. This option would slow and somewhat discourage traffic that is currently using the Coddington Road-Hudson Street route as a through movement into and/or out of the City of Ithaca and would further encourage Coddington Road to become the dominant traffic movement. Further discussion of this option can be found in *Section III-b* of this report.

A new subdivision is being developed just south of the Community Center. This subdivision, which consists of several new homes, features a common access road that currently connects to Coddington Road. This access road may at a future time become a dedicated Town road.

East King Road: An Initial Project Proposal (IPP) was submitted to the NYSDOT in 1998 and again in 2004 for improvement of this road. The proposed project scope includes reconstructing East King Road from NYS Rt. 96B to Coddington Road (approximately 1.3 kilometers or 2.1 miles), widening the travel lanes from 3 meters (10 feet) to 3.3 meters (11 feet), widening and paving the shoulders from 0.6 meters (2 feet) to 1.5 meters (5 feet). There is no anticipated schedule to complete this work at this time.

Previous project proposals for Coddington Road which contained similar improvements along Coddington Road extended further south to German Cross Road (in the Town of Danby) and Caroline Depot Road (in the Town of Caroline). Projects of reduced scope on both Coddington Road and East King Road are included in an ongoing County 5-year capital program.

Troy Road will also likely be rehabilitated within the next five years. At that time the County will consider if enhancements are needed due to the significant development that continues in this area. Shoulder enhancements for pedestrian traffic are also possible.

The Aurora Street Bridge, a connecting segment north of the project limits beyond Hudson Street, is being rebuilt as a federally funded project during 2007.

On June 19, 2007, the Tompkins County Legislature approved transferring jurisdiction of Burns Road, an urban collector, from the Town of Ithaca to the County. Improvements to Burns Road may be proposed in the future.

g. Speeds and Delays

Traffic along Coddington Road can be described as mostly free flowing with occasional delay primarily due to vehicles waiting to turn left across opposing traffic.

The population growth rate for the Town of Ithaca and for the entire Tompkins County area is about 0.5 percent, which is based on the US Census Data provided to the County by the Town of Ithaca Planning Department. Therefore it is not anticipated that there will be any significant increases in the rate of traffic growth within the next twenty years.

The following table represents the existing posted speed limit along Coddington Road and the associated 85th percentile speeds:

Location	Posted Speed Limit	85th Percentile Speed	
		Location	Speed
Danby Town line to Troy Road	73 km/hr (45 mph)*	Just south of Updike Road	94 km/hr (58 mph)
		Just south of Burns Road	76 km/hr (47 mph)
		475 meters south of Troy Road	85 km/hr (53 mph)
Troy Road to Juniper Drive	65 km/hr (40 mph)	No speed information available. The 85th percentile speed is an average from two surrounding locations	76 km/hr (47 mph)
Juniper Drive to City of Ithaca line	48 km/hr (30 mph)	70 meters south of Ithaca College entrance	66 km/hr (41 mph)

* A school zone speed of 56 km/hr (35 mph) is posted in the vicinity of the community center.

Table II – 4 Speeds

Based on the existing traffic volumes there are no existing delays along Coddington Road. Based on anticipated growth rates and futures traffic volumes, no future delay is expected. Therefore no speed and delay runs are required.

h. Traffic Volumes

The following table summarizes the traffic volumes along Coddington Road:

Location	2004			2027		
	AADT	DHV	Truck Traffic	AADT	DHV	Truck Traffic
500ft (152m) south of Burns Rd	965	164	12%	1076	183	12%
East King Road to Troy Road	757	130	4%	884	145	4%
230ft (70m) south of Ithaca College	1498	254	4%	1660	283	4%
Ithaca College to north project limit	2872	303	12%	3202	338	12%

Table II-5 Traffic Volumes along Coddington Road

Additional line counts were also taken between the intersections of Burns Road and East King Road. The 2004 AADT (2799) and DHV (315) volumes at this location were significantly higher than at the two adjacent locations along Coddington Road. We have concluded that these higher volumes can be attributed to the "cut through" traffic generally headed east-west along the Burns Road and East King Road corridor. These counts should be considered more like turning movement counts rather than as line counts along Coddington Road and as such have been discounted as misleading data when analyzing the Level of Service along Coddington Road.

Turning movement counts for the peak AM and PM hours were taken at the intersections with Burns Road, East King Road, Troy Road, Ithaca College Entrance and Hudson Street. These turning volumes were then inflated to the

design year volumes (2027) based on the projected annual growth rate of 0.5 percent per year. See *Appendix C* for turning movement counts and diagrams.

Ithaca College in conjunction with Tompkins County recently completed additional traffic volume counts in the vicinity of the Ithaca College campus and along the Coddington Road project corridor. After reviewing this data it was apparent that while the new volumes were somewhat higher than the counts taken in 2004 (which were used for this planning report), the difference in volume was not significant enough to warrant additional analysis and that no noteworthy changes in the results of this study would be recognized. The 2007 traffic data has also been included in *Appendix C.*

i. Level of Service

(1) Level of Service along Coddington Road

A capacity analysis was completed at two locations along Coddington Road (just south of Burns Road and just south of the Ithaca College entrance) using Highway Capacity Software (HCS2000), developed by "McTrans" in accordance with the 2000 Highway Capacity Manual. Each location was analyzed using vehicle flows during AM and PM peak periods for both existing conditions (2004) and estimated future conditions; ETC + 20 (year 2027). A summary of the results is presented in the following table (*Table II-6*). All "Two-Lane" capacity analysis output sheets can be found in *Appendix C.*

Location	Existing Conditions (2004)		ETC + 20 (2027)	
	AM	PM	AM	PM
500ft (152m) south of Burns Road	B	A	B	B
East King Road to Troy Road	B	A	B	A
230ft (70m) south of Ithaca College	C	B	C	B
450ft (137m) south of Ithaca City Line	C	C	C	C

Table II - 6 Level of Service Along Coddington Road

Table II-6 indicates that Coddington Road is currently operating at acceptable LOS and will maintain basically the same LOS in the year 2027. In the year 2027, there will be a slight decrease in LOS near the entrance to Ithaca College and near the City of Ithaca City Line. However Coddington Road will still operate with acceptable LOS in these locations.

It should be noted that the AM peak traffic volumes along Coddington Road are slightly higher than the PM peak volumes because the AM peak is a combination of normal commuter traffic and college traffic and the PM peak does not as intensely contain college traffic since a significant portion of the PM college traffic occurs earlier in the afternoon.

(2) Level of Service at Intersections

A capacity analysis was completed at four intersections along Coddington Road using Highway Capacity Software (HCS2000), developed by "McTrans" in accord with the 2000 Highway Capacity Manual methods for estimating LOS for un-signalized intersections. Each intersection was analyzed using vehicle flows during AM and PM peak periods for both existing conditions and estimated future conditions (ETC + 20). A summary of the results is presented in the following table (*Table II-7*). All "Two Way Stop Condition" and/or "All Way Stop Condition" capacity analysis output sheets can be found in *Appendix C.*

Coddington Road Intersection		Existing (2005)		ETC + 20 (2027)	
		AM	PM	AM	PM
Ithaca College Entrance					
Northbound	LT	A	A	A	A
Eastbound	L	B	B	B	B
Eastbound	R	A	A	A	A
Overall		**A**	**A**	**A**	**A**
Burns Road					
Southbound	LT	A	A	A	A
Westbound	LR	A	B	B	B
Overall		**A**	**A**	**A**	**A**
East King Road					
Northbound	LT	A	A	A	A
Eastbound	LR	A	A	A	B
Overall		**A**	**A**	**A**	**A**
Troy Road					
Northbound	LT	A	A	A	A
Eastbound	LR	A	B	B	B
Overall		**A**	**A**	**A**	**A**
Hudson Street					
Northbound	LT	A	No data was available for analysis	A	No data was available for analysis
Southbound	TR	A		A	
Eastbound	LR	A		A	
Overall		**A**		**A**	
Realigned Burns Road (creating 4-way tee intersection with East King Road)					
Southbound	LTR	Not an existing condition	Not an existing condition	A	A
Eastbound	LTR			B	B
Northbound	LTR			A	A
Westbound	LTR			B	B
Overall				**A**	**A**

L – Left
LT – Shared Left / Through
TR – Shared Through / Right
LR – Shared Left / Right
R – Right
LTR – Shared Left / Through / Right

Table II – 7 Level of Service at Intersections

Table II-7 shows that all of the analyzed intersections are currently operating with acceptable LOS and will continue to operate at basically the same LOS through the year 2027. LOS analysis of the Burns Road / East King Road intersection, reconfigured as a four-way intersection indicates that the reconfiguration will not improve the LOS of the intersection(s) and will in fact be slightly lower than the current configuration of the Burns Road and East King Road intersections (operating separately).

j. Non-Standard Features and Other Non-Conforming Features

The existing Coddington Road contains many non-standard features including sight distances, shoulder widths, travel lane widths. *Table II-8* compares several basic features of the existing roadway with the design standards.

Feature	Existing Conditions	Design Standards
Sight Distance	Multiple locations between 30 and 104 meters, see *Table II-2*	105 meters (minimum)
Shoulder Widths	Multiple locations of narrow width between 0.4 and 1.2 m wide (gravel), see *Table II-1*	1.2 m wide (paved)
Travel Lane Widths	3.0 m wide	3.3 m wide

Table II-8 Basic Non-conforming Features

For the purposes of this project the Basic Recovery Width, as defined in Chapter 10 of the NYSDOT Highway Design Manual, is equivalent to the full Clear Zone Width along the project length. *Table II-9* summarizes the required Clear Zone/Basic Recovery Slopes and Widths for a design speeds and ADTs along the project.

Design Speed= 70 Km/hr, ADT = 750 to1500 vpd (South of Troy Road)					
Fill Slopes			Cut Slopes		
1:6 or flatter	1:5 or 1:4	1:3	1:3	1:5 or 1:4	1:6 or flatter
4.9 meters	5.4 meters	n/a	3.3 meters	3.9 meters	4.6 meters
Design Speed= 60 Km/hr, ADT = 750 to1500 vpd (near Community Center)					
Fill Slopes			Cut Slopes		
1:6 or flatter	1:5 or 1:4	1:3	1:3	1:5 or 1:4	1:6 or flatter
3.3 meters	3.9 meters	n/a	3.3 meters	3.3 meters	3.3 meters
Design Speed= 60 Km/hr, ADT 1500 to 6000 vpd, (North of Troy Road)					
Fill Slopes			Cut Slopes		
1:6 or flatter	1:5 or 1:4	1:3	1:3	1:5 or 1:4	1:6 or flatter
3.9 meters	4.6 meters	n/a	3.9 meters	3.9 meters	3.9 meters

Table II – 9 Required Clear Zone Slopes and Widths

There are 19 cross culverts along the project which are 600mm or greater in diameter. All of these culverts have head walls or end sections which result in sudden drop offs (steeper than 1:2 slope) with no barriers protecting these drop offs.

Table II-9a summarizes the longitudinal ditches deeper than 0.6 meters with non-traversable slopes (steeper than 1:3).

Station Range (West Side)	Slope	Ditch Depth (m)	Station Range (West Side)	Slope	Ditch Depth (m)
1+010 – 1+115	1:2	0.6 – 1.2	3+545 – 3+610	1:2	0.6 – 0.9
1+270 – 1+485	1:2	0.6 – 1.0	3+650 – 3+750	1:2	0.6 – 0.7
1+500 – 1+520	1:1	0.6 – 1.2	3+905 – 3+958	1:2	0.6 – 1.3
2+050 – 2+090	1:2	0.6 – 0.9	4+175 – 4+430	1:2	0.6 – 1.5
2+240 – 2+260	1:2	0.6 – 0.8	4+700 – 4+740	1:2	0.6 – 3.0
2+320 – 2+360	1:2	0.6 – 1.5	4+880 – 5+060	1:2	0.6 – 0.8
2+555 – 2+820	1:2	0.6 – 1.2	5+160 – 5+190	1:2	0.6 – 1.3
2+890 – 2+975	1:2	0.6 – 2.0	5+340 – 5+375	1:2	0.6 – 0.8
3+070 – 3+130	1:1	0.6 – 1.0	5+445 – 5+625	1:2	0.6 – 1.2
3+240 – 3+290	1:2	0.6 – 1.1			

Table II – 9a Existing Non-Standard Slopes/Ditches

Based on the station ranges in the above table, the west side of Coddington Road contains non-standard ditches along 37% of the project length. The remaining 63% of the west side of Coddington Road either contains ditches that are less than 0.6 meters deep, have fore slopes that are 1on3 or flatter or do not contain ditches at all. The east side of Coddington Road consists of fill slopes with no ditches.

There are many locations along the project which contain mature trees adjacent to the traveled way within the clear zone. Many of these trees are considered important to the character of the corridor and provide traffic calming and visual screening benefits. These tree locations are summarized in *Table II-10.*

Left Side					Right Side				
Slope	Clear Zone Width (m)	Tree Location		Tree Size (DBH)* (mm)	Slope	Clear Zone Width (m)	Tree Location		Tree Size (DBH)* (mm)
		Station	Offset (from edge of travel lane)				Station	Offset (from edge of travel lane)	
<1:6 C	4.6	1+085.9	4.4m	305	<1:6 F	4.9	1+019.0	4.4m	700
		1+087.6	4.5m	450			1+035.5	4.4m	200
1:4 C	3.9	1+156.6	3.4m	450	<1:6 F	4.9	1+632.2	3.6m	100
		1+159.2	3.7m	400					
		1+163.8	3.5m	750	1:2 F	n/a	1+988.8	5.2m	200
		1+169.9	3.2m	305					
<1:6 C	4.6	1+392.1	4.0m	3-bole	1:4 F	5.4	1+988.8	5.2m	200
1:2 C	3.3	1+469.0	3.3m	250	<1:6 F	4.9	2+880.3	3.0m	400
1:4 F	5.4	1+525.6	3.7m	250					
		1+533.2	4.3m	220	1:5 F	5.4	3+282.2	4.0m	200
		1+538.5	3.6m	305			3+287.9	3.2m	200
1:4 C	3.9	2+190.3	3.6m	1000			3+289.0	3.1m	200
							3+292.2	4.2m	305
1:5 C	3.9	2+527.3	3.7m	400			3+304.8	4.4m	250
		2+536.9	3.9m	100					
1:4 C	3.9	2+915.5	3.2m	m-bole	<1:6 F	4.9	4+460.6	4.9m	100
<1:6 C	4.6	3+215.4	4.1m	1000	<1:6 F	4.9	4+762.9	4.5m	100
							4+767.3	4.7m	100
<1:6 C	4.6	3+304.2	4.4m	800			4+775.5	4.9m	100
<1:6 C	4.6	3+567.5	4.1m	600	1:4 F	5.4	4+841.2	5.0m	305
							4+853.1	3.8m	305
<1:6 C	4.6	4+213.9	3.9m	150			4+871	3.2m	250
1:2 C	3.3	5+223.7	2.8m	250	1:4 F	5.4	4+999.8	2.5m	100
							5+006.4	3.5m	200
1:2 C	3.3	5+338.4	2.2m	610			5+009.2	3.4m	100
		5+347.4	1.8m	610			5+014.1	4.9m	305
		5+357.7	1.8m	610					
1:2 C	3.9	5+565.2	2.3m	305					
		5+568.8	1.9m	200					
		5+579.8	1.9m	305					
1:2 C	3.3	5+703.4	2.9m	500					
		5+705.6	2.6m	400					
		5+706.9	2.3m	400					
		5+710.6	2.7m	500					
		5+711.8	2.4m	500					
		5+712.9	2.5m	500					

*DBH - Diameter of tree trunk, measured at breast height.

Table II – 10 Trees Located Within Clear Zone

k. Safety Conditions, Accident History and Analysis

Accident reports for the project corridor were investigated for number, location, type and cause. The accidents included in the current review occurred during three years (1999, 2000, and 2003). Accident data for the years 2001 and 2002 were not available according to the State and County police due to record keeping deficiencies.

During these study years, 12 accidents were documented at or near the intersections and road segments included in this project. An annual accident summary is presented in *Table II-11*.

YEAR	FATAL	INJURY	PROPERTY DAMAGE ONLY	NON-REPORTABLES	TOTALS
1999	-	-	3	-	3
2000	-	-	3	-	3
2001	n/a	n/a	n/a	n/a	n/a
2002	n/a	n/a	n/a	n/a	n/a
2003	-	4	2	-	6
TOTALS	**0**	**4**	**8**	**0**	**12**

Table II – 11 Annual Accident Summary

It should be noted that there was a recent (2005) fatality on East King Road near the intersection with Coddington Road. A dump truck turned onto East King Road and struck and killed a pedestrian who was crossing the road after visiting his mail box. Based on the existing geometry of East King Road in the vicinity of the accident, poor sight distance was not significant contributing factor in the accident.

There have been several bicycle accidents along the project corridor over the past 15 years. One occurred in the early nineties between the Ithaca College entrance and Hudson Street which involved a pedestrian who was hit and killed by a bicycle. Another accident occurred 8/19/03 in the 600 block of Coddington Road (north of E. King) where a northbound bicyclist was hit from behind by vehicle, injuring bicyclist. Finally, there was an accident in 2006 south of the project limits. Again, a northbound vehicle struck and injured the cyclist from behind. Though outside the project limits, it is indicative of the problem and conflict between vehicular traffic and cyclists along Coddington Road.

Several roadway segments within the project area were investigated to identify high incident areas and possible trends/causes of the accidents. The analysis included documented number of incidences, location, type and cause within each roadway segment and at each intersection. Summaries of the findings are

shown in *Table II-12a* (for accidents occurring along Coddington Road) and *Table II-12b* (for accidents occurring specifically at intersections). Schematic accident location plans can be found in *Appendix D.*

	ROAD SEGMENT											
ACCIDENT TPYE	Autumn Ridge Ln to Updike Rd	Updike Road to Burns Road	Burns Road to East King Road	East King to Troy Road	Troy Road to Rich Road	Rich Rd to Northview Road(s)	Northview Road(s) to Juniper Drive	Juniper Drive to Spruce Way	Spruce to Ithaca Coll. Entrance	Ithaca Coll. Entr. to Hudson St	**TOTAL**	**%**
Sideswipe	-	-	-	-	-	-	-	-	-	-	0	0.00
Rear End	-	-	-	-	-	-	1	-	-	-	1	11.11
Right Angle	-	-	-	-	-	-	-	-	-	-	0	0.00
Left Turn	-	-	-	-	-	-	-	-	-	-	0	0.00
Pedestrian	-	-	-	-	-	-	-	-	-	-	0	0.00
Fixed Object	-	-	-	-	-	-	-	-	-	-	0	0.00
Head On	-	-	-	-	-	-	-	-	-	-	0	0.00
Bicyclist	-	1	-	-	-	-	-	-	-	-	1	11.11
Right Turn	-	-	-	-	-	-	-	-	-	-	0	0.00
Driveway	-	-	-	-	-	-	-	-	-	-	0	0.00
Backing	-	-	-	-	-	-	-	-	-	-	0	0.00
Overtaking	-	-	-	-	-	-	-	-	-	-	0	0.00
Single	1	-	-	-	-	-	-	-	-	-	1	11.11
Animal	1	-	-	2	-	1	-	1	-	-	5	55.56
Parked	-	-	-	1	-	-	-	-	-	-	1	11.11
Other	-	-	-	-	-	-	-	-	-	-	0	0.00
												0.00
Total	**2**	**1**	**0**	**3**	**0**	**1**	**1**	**1**	**0**	**0**	**9**	**100.00**

Table II – 12a Accident Summary – Road Segments

ACCIDENT TYPE	INTERSECTION											TOTAL	%
	Autumn Ridge Lane	Updike Road	Burns Road	East King Road	Troy Road	Rich Road	(W&E) Northview Road(s)	Juniper Drive	Spruce Way	Ithaca College Entrance	Hudson Street		
Sideswipe	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Rear End	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Right Angle	-	1	1	-	-	-	-	-	-	-	-	2	66.67
Left Turn	-	-	1	-	-	-	-	-	-	-	-	1	33.33
Pedestrian	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Fixed Object	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Head On	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Bicyclist	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Right Turn	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Driveway	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Backing	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Overtaking	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Single	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Animal	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Parked	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Other	-	-	-	-	-	-	-	-	-	-	-	0	0.00
Total	**0**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**100.00**

Table II – 12b Accident Summary - Intersections

Accident rates were calculated and compared to the State wide accident rates for similar facilities. The comparison shows that the overall accident rate for Coddington Road highway segment is slightly higher than the State wide average rate. This is most likely due to poor existing sight distances and the relatively large number of deer related accidents. The intersection accident rate along Coddington road is significantly higher the state wide rate. Given the low number of total accidents summarized in Table II-12b, it is intuitively obvious that even one additional accident would drastically skew the results of the comparison, given the relatively low volume of vehicles entering each intersection, and so this comparison is some what misleading and inconsequential. Poor sight distance at these intersections is the probable cause of a majority of these accidents. The comparisons are presented in the

following tables, *Table II-13a* (for accidents occurring along Coddington Road) and *Table II-13b* (for accidents occurring specifically at intersections). Project rate calculations and State wide rate data can be found in *Appendix D.*

Improvements to the sight distance along the project will likely reduce the accident rates for both the project highway segments and at intersections such as Burns Road.

Description of Project Segment	Actual Project Rate (Acc/MVM)	State Wide Average Rate (Acc/MVM)
Danby line to City of Ithaca line (entire project length)	9.01	2.81

Table II – 13a Accident Rate Comparison - Project Segments

Description of Project Intersection	Actual Project Rate (Acc/MEV)	State Wide Average Rate (Acc/MEV)
Updike Road	1.13	0.16
Burns Road	1.37	0.16

Table II – 13b Accident Rate Comparison – Intersections

The segment of Coddington Road from Spruce Way (just south of the Ithaca College entrance) to Hudson Street contains many multi-dwelling structures along the east side of the roadway. This condition generates additional vehicles parking along the side of the road in shallow off street pull off areas (in addition to the driveways for each property). This creates many more opportunities for vehicles to back out into Coddington Road on a daily basis from additional locations creating an unsafe condition.

I. Pavement and Shoulder Conditions

(1) Pavement

The pavement is in fair to poor condition with moderate to severe amounts of alligator cracking and rutting. Tompkins County performed a thin overlay in 2003 as a stop gap measure along Coddington Road, but the condition of this overlay has already started to deteriorate. Test borings along Coddington Road indicate that the existing subbase and asphalt thickness along the project varies from as little as 1.5 inches thick to as much as 12 inches thick with an average thickness of only 4.8 inches. Test boring also indicate that the subbase and/or gravel fill thickness varies from as little as 0 inches thick to as much as 30 inches thick with an average thickness of only 9.8 inches. Some sections of pavement consist of a mere 3 inch total asphalt thickness with no subbase material at all. The pavement thickness at the south end of the project is generally thicker than at the north end of the project with asphalt depths of between 14 and 6 inches compared to thickness of between 8 and 1.5 inches in the more northern sections of the project. In several test boring locations the

shallow pavement thickness was likely due to the presence of shallow bed rock in the roadway subgrade. For further information on existing asphalt thicknesses, refer to *Appendix F*.

(2) Shoulders

The existing shoulders are unpaved (gravel), vary in width and are in fair condition. The majority of the project contains shoulders which are between 0.9 meters (3ft) and 1.2 meters (4ft) wide with some area containing shoulders as wide as 2.1 meters (7ft). The shoulders are part of an open section with no curbs or gutters to contain the surface runoff and as a result the gravel has a high tendency of eroding away requiring periodic maintenance. The existing shoulder width does not provide an adequate width for pedestrians, bicycles or emergency stopping in most areas. The gravel surface of the shoulders is not adequate for pedestrian or bicycle use. This results in cyclists and pedestrians intruding on the vehicular travel lane creating a hazardous condition.

m. Guide Railing, Median Barrier and Impact Attenuators Devices

The only sections of existing guide rail, median barrier, or impact attenuators within the project limits are at a large culvert at the Burns Road intersection. A 10 meter (33 feet) long section of corrugated W-beam guiderail located at the northeast corner of Burns Road and a 19 meter (62 feet) long section is located on the west side of Coddington Road, opposite Burns Road. There are several large cross culverts which include severe drop-offs due to the existing culvert headwalls or steep slopes (1:2 or greater) of up to 2.4 meters (8 feet) high near the edge of the shoulder (within the clear zone) with no guiderail protection. The extent of new guiderail installation will be determined during final design.

n. Traffic Control Devices (Signs, Signals, etc.)

There are no traffic signals along Coddington Road within the project limits. All intersections are controlled with stop signs on the minor streets. The Hudson Street-Coddington Road Intersection at the northern project limit is controlled with stop signs northbound and southbound on Coddington Road and southbound on Hudson Street. Members of the community, particularly those living along Coddington Road, have indicated a desire to incorporate some traffic calming devices along Coddington Road. One option, which has been requested by the public, was to explore the possibility of adding stop signs to the Burns Road and East King Road intersections on Coddington Road. Refer to *Section III-B-3* of this report for further discussion on this topic.

o. Structures / Culverts

There are no major structures within the project limits. However there are 26 cross culverts along the project that convey stream flow to the Six-Mile Creek and the Ithaca Reservoir. *Table II-14* summarizes the cross culverts along the project limits:

Culvert ID	Culvert Station	Culvert Size mm (inches)	Existing Material	Condition
1	1+115	830 (33")	Steel	Poor
2	1+207	640 (27")	Steel	Poor
3	1+420	457 (18")	Steel	Poor
4	1+518	457 (18")	Steel	Poor
5	1+615	610 (24")	Steel	Poor
6	1+845	2400 (95")	Steel	Poor
7	1+895	1350 (53")	Steel	Poor
8	2+065	457 (18")	Steel	Poor
9	2+348	1900 (75")	Steel	Poor
10	2+560	1800 (71")	Steel	Poor
11	2+785	1220 (48")	Steel	Poor
12	2+972	1220 (48")	Steel	Poor
12A	3+124	457 (18")	Steel	Poor
13	3+329	610 (24")	Steel	Poor
14	3+548	800 (32")	Steel	Poor
15	3+820	600 (24")	Steel	Poor
16	3+908	900 (36")	Steel	Poor
17	4+400	960x1400 (38"x56")	CMP	Fair
18	4+597	610 (24")	CMP	Fair
19	4+725	1340 (54")	Steel	Poor
20	4+840	457 (18")	Steel	Poor
21	4+915	457 (18")	Steel	Poor
22	5+190	920 (36")	Steel	Poor
23	5+375	920 (36")	Steel	Poor
24	5+550	710 (28")	Steel	Poor
25	5+685	750 (30")	Steel	Poor

Table II-14 – Existing Culverts along Coddington Road

A contributing drainage area was delineated and measured for each cross culvert. Anticipated peak flows were calculated. Then the hydraulic capacity of each cross culvert was evaluated to determine if it is capable of conveying a 50-year storm event under existing conditions. *Table II-15* presents a summary of this hydraulic evaluation. In summary, 14 of the 26 culverts (or 54%) are hydraulically inadequate to convey a 50-year storm event. The required size culvert for each case will be determined in final design based on many factors such as new roadway geometry, and the selection of culvert material and configuration.

Culvert ID	Culvert Size mm (inches)	Peak Flow (50-yr Storm)	Capacity Analysis (Manning's Equation)		Culvert Analysis (HY-8 or Hec-Ras)	Hydraulic Adequacy
		(cfs)	Capacity (cfs)	Adequate	Adequate	
1	830 (33")	110.43	144.40	Yes	No	Not Adequate
2	640 (27")	33.54	42.05	Yes	*N/A	Adequate
3	457 (18")	41.36	21.48	No	*N/A	Not Adequate
4	457 (18")	31.66	22.02	No	*N/A	Not Adequate
5	610 (24")	14.67	57.56	Yes	Yes	Adequate
6	2400 (95")	274.50	1766.71	Yes	Yes	Adequate
7	1350 (53")	135.05	504.60	Yes	Yes	Adequate
8	457 (18")	68.27	32.31	No	*N/A	Not Adequate
9	1900 (75")	407.45	1499.63	Yes	No	Not Adequate
10	1800 (71")	136.20	1307.35	Yes	Yes	Adequate
11	1220 (48")	150.78	284.77	Yes	No	Not Adequate
12	1220 (48")	231.66	380.61	Yes	No	Not Adequate
12A	457 (18")	13.05	21.12	Yes	*N/A	Adequate
13	610 (24")	17.22	38.39	Yes	Yes	Adequate
14	800 (32")	232.80	83.17	No	No	Not Adequate
15	600 (24")	11.52	35.25	Yes	Yes	Adequate
16	900 (36")	33.06	132.56	Yes	Yes	Adequate
17	960x1400 (38"x56")	194.57	131.86	No	*N/A	Not Adequate
18	610 (24")	66.42	36.35	No	No	Not Adequate
19	1340 (54")	74.84	900.11	Yes	Yes	Adequate
20	457 (18")	27.15	14.14	No	*N/A	Not Adequate
21	457 (18")	16.54	12.93	No	*N/A	Not Adequate
22	920 (36")	7.83	157.68	Yes	Yes	Adequate
23	920 (36")	74.17	196.65	Yes	No	Not Adequate
24	710 (28")	20.72	73.99	Yes	*N/A	Adequate
25	750 (30")	60.15	108.68	Yes	No	Not Adequate

Table II-15 – Hydraulic Summary

*Note: Certain culverts noted in the table above contained basic flow characteristics that did not warrant a hydraulic analysis beyond a simple Manning's Equation analysis, therefore no HEC-RAS or HY-8 analysis was performed.

p. Drainage System

The vast majority of the project contains an open drainage system consisting of road side ditches, driveway culvert pipes and open section slope runoff. There are also a few short segments of closed drainage systems along the project which tie into the cross culvert systems near some of the intersections along the project. There are no severe drainage issues along the project, although several of the larger cross culverts do show evidence of stream bank and bottom erosion at the outlet side of the culvert. Additional development in the vicinity of Troy Road and other connecting roadways just upstream (west of Coddington Road) have created additional storm water runoff which could cause flooding issues at the cross culverts along Coddington Road where

pipe size has been identified as inadequate. The drainage calculations indicate that several of the culverts are not adequately sized to accommodate a 50 year storm event. There are also several drainage problem areas along the road where ditch capacity is an issue. Several residents have expressed drainage concerns during recent years including perennial flooding problems at the drainage pipes either side of Troy Road. Tompkins County's Sr. Highway Supervisor has also noticed similar pipe capacity problems. During a storm event in early March 2006 the large culvert north of Burns (Station 2+350) over topped the road when the culvert plugged with debris. This investigation has not been pursued any further at this time since all culverts are scheduled for replacement due to age and condition regardless of existing hydraulic capacity.

q. Utilities

(1) Water

Starting at house number 925 Coddington Road (station 1+550) and proceeding north to Burns Road, there is an 8-inch cement lined ductile iron water main along the west side of Coddington Road. This section of the water main was installed in the late 1990's and is about 7 years old.

Just south of the Burns Road intersection, the 8-inch cement lined ductile iron water main crosses to the east side of the road and continues along Coddington Road to around house number 636 (station 3+610). At this point, the water main again crosses the road to the west side of Coddington Road and continues to the north to Rich Road. From Rich Road to just after house number 380 (station 4+800) there is water main on both sides of Coddington Road. From this point northerly a single 8-inch cement lined ductile iron water main runs along the east side of Coddington Road to the northern limit of the project. There is an existing pump station on the west side of Coddington Road, approximately 140 meters south of Rich Road. The water main from Burns Road to the north end of the project was installed in the late 1960's.

(2) Sanitary

Coddington Road contains an 8-inch sanitary sewer which starts approximately 540 meters south of Troy Road and flows north along Coddington Road. This section of the sewer, south of Troy Road, is located between 10 and 20 meters west of the westerly Right of Way line. From Troy Road to the north limit of the project, the 8" sanitary sewer runs along the westerly edge of the existing pavement along Coddington Road. The existing sewer manholes are spaced at an approximate spacing of 90 meters (300 ft) with additional manholes at intersecting sewer locations along the project.

(3) Gas and Petroleum

An 8 inch high pressure petroleum pipeline crosses Coddington Road approximately 52 meters north of the Danby line. This facility is owned and maintained by TEPPCO Petroleum. A 20 inch and a 30 inch petroleum transmission pipelines cross Coddington Road approximately 350 meters north of the Danby line. These facilities are owned by Dominion Transmission Inc.

NYSEG maintains a 6 inch natural gas main which starts at house number 803, just south of Burns Road, and continues to the north. The gas main is located on the east side of Coddington Road to house number 259 (station 5+440). The offset distance of this gas main varies, but it is generally located outside the easterly ROW line. Beginning at approximately 55 meters south of Spruce Way (station 5+225), NYSEG maintains another 6" natural gas main which runs along the west side of Coddington Road to the north and beyond the project limits. This gas main is generally located outside the westerly ROW line of Coddington Road, but there are short sections that are located within the ROW.

(4) Telephone

Verizon Communications maintains buried telephone cables along both sides of Coddington Road from the Danby line to Burns Road. In most locations this buried cable is outside the Right of Way. The buried telephone cable on the east side moves into the Right of Way at approximately house number 929 (station 1+400) and remains within the Right of Way to approximately house number 803 (near Burns Road). The buried telephone cable on the west side is located within the Right of Way at limited locations, as shown on plans.

r. Geotechnical

A geotechnical engineering study and report was completed for the Coddington Road Project on November 21, 2005. The scope of the study included the performance of 77 test borings along the project corridor which includes pavement cores, split-spoon sampling of the subsurface soils, rock cores at strategic locations and DIPRA 10 point testing for corrosive soils.

Borings B-1 through B-69 were advanced to a depth between 1.2 meters (4 ft) and 3.6 meters (12 ft) or refusal as part of this investigation. The investigation yielded 12 borings that located rock depths between 0.3 meters (1 ft) and 2.3 meters (7.7 feet) below the existing pavement surface. These locations were all clustered between just north of Rich Road (station 4+500) and the Hudson Street Intersection (station 6+050) with one boring on Updike Road which also indicated refusal at 1.3 meters (4.1 feet). The majority of the test borings indicated the presence of brown sand with traces of clay and gravel in the subgrade. This material was further described as a moist material with a mixed

level of firmness. The split spoon blow counts also indicate the there are many areas with potentially low bearing capacity. These areas will require proof rolling and density testing during the subgrade preparation process to ensure adequate subgrade support. Depending on field conditions during the construction process, areas of undercutting may also become necessary. *Section III* of this report under *Feasible Alternatives* contains further discussion of the required pavement section based on these conditions and based on the projected traffic volumes.

The geotechnical report raised concerns about the overall pavement thickness along Coddington Road. Many of the test locations revealed that the total asphalt thickness was a little as 40mm (1.5inches) thick with a majority of the locations at the north end of the project at only 90mm (3.5inches) thick. This section is not sufficient to support the traffic volumes along Coddington Road. Many of these locations contained little or no gravel subbase which only further exacerbates the problem.

Ductile Iron Pipe Research Association (DIPRA) ten-point testing was performed at sixteen (16) locations along the project to determine soil corrositivity. Five (5) different lab tests (Resistivity, Redox, pH, Sulfides, and Moisture Content) were performed on the collected soil samples at these 16 locations. DIPRA recommends these five factors be tested and a point value assigned for each result. If the total number of points for any one-sample location exceeds a value of 10, then the soil is considered to contain corrosive properties worthy of corrosion protection.

Of the 16 test locations, only 6 resulted in point values of 10 or greater. There was no distinct pattern to these locations, but in general the locations which received higher point values did so due to low resistivity to electrical current flow which can create significant corrosive conditions. The project has no direct plans to replace or install new water main, but it will become necessary along significant sections due to vertical grade changes that result in inadequate depth of cover and in locations where the proposed underdrain or the proposed storm drainage system conflict with the existing water main.

The results of the Geotechnical Report can be found in *Appendix F.*

s. Visual Assessment

Coddington Road from the Danby Town Line to the City of Ithaca line is located in the Town of Ithaca in a rural to semi-urban residential setting. The rolling terrain contains moderate grades, with vertical sag curves and crest vertical curves which provide poor sight distance throughout the project corridor.

Land use consists of older homes along both sides of the roadway. The age range of the homes includes mostly structures which are at least 30 years old with several structures which date back to mid and early 1800's. Most of the

properties along Coddington Road are single family homes, but there are several multi family structures in the vicinity of the Ithaca College entrance which serve as off campus student housing.

The structures along Coddington Road are generally set back from the Right of Way between 5 and 15 meters with some secondary structures located closer. The houses north of Spruce Way are generally closer to the highway boundary than those further to the south. Utility poles, hydrants and signage reinforce the residential nature of the corridor. Along Coddington Road the majority of the vegetation inside and outside the ROW consists of mature trees and shrubbery which provide some visual relief from the utilities, signage and other artificial surfaces along the project corridor.

t. Provisions for Pedestrians and Bicyclists

Currently there are no provisions for pedestrians or bicyclists along Coddington Road. However, the draft Town of Ithaca Transportation Plan identified Coddington Road between Hudson Street and the Ithaca College entrance as being an "essential corridor" with "immediate need" for pedestrian facilities. The area between Ithaca College and Troy Road is a "recommended corridor" where there is a "long-term need" for pedestrian facilities. The Town's map of "Prioritized Bicycle Needs" states, "There is a significant existing need for a connection between Ithaca College & the City of Ithaca." Referring to needed bicycle infrastructure, Coddington Road from Ithaca College to Troy Road is considered a "high priority"; from Troy Road to the Danby Town line a "medium priority".

Bicyclists regularly use Coddington Road and often can be seen riding out in the travel lane, blocking and slowing down traffic, forcing cars to pass them using the opposing travel lane. The full Town Transportation Plan may be viewed on the web at <http://www.town.ithaca.ny.us/trans/plan/plan.htm>.

Ithaca College is the only significant pedestrian generator/destination along Coddington Road. There is an existing walkway on the Ithaca College campus which ends at the west side of Coddington Road. Pedestrians using this walkway cross or walk along the edge of Coddington Road to travel between the campus and nearby off-campus housing or to the City of Ithaca, which is located to the north.

There is a parallel pedestrian "Hike and Bike" trail that is located just east of Coddington Road. This trail is located along the historic Ithaca-Owego railroad bed which was chartered in 1828. The trail is directly adjacent to the project corridor at the Hudson Street intersection. As the trail continues in a southerly direction, it diverges from Coddington Road significantly. Approximately 850 meters south of the Hudson Street intersection, the trail crosses Juniper Drive which provides an additional access point to the trail from Coddington Road. During the scoping phase of the project, the need to

provide a sidewalk along Coddington Road from Juniper Drive to the Hudson Street intersection creating a "closed loop" pedestrian facility (with the trail) was identified. There is also a possibility of creating additional recreation trail connections between Rich Road and Burns Road.

A Pedestrian Check List has been completed and has been included as part of *Appendix G.*

u. Planned Area Development

The Town of Ithaca and/or Tompkins County are not aware of any plans for significant future development along Coddington Road. Coddington Road is considered to be near full built and there are no future plans to change its residential character.

Tompkins County has indicated that there are plans for a 14 home subdivision to be built along Troy Road between Coddington Road and East King Road and additional residential developments along other portions of Troy Road.

A new subdivision is being developed on Coddington Road just south of the Community Center. This subdivision, which consists of approximately 5 new homes, features a common access road that currently connects to Coddington Road. This access road may at a future time become a dedicated Town road.

Tompkins County has plans to perform drainage and pavement maintenance along East King Road west of Troy Road and along Troy Road, but no definite schedule has been identified at this time. At that time the County will consider if enhancements are needed due to the significant development that continues in this area. Shoulder enhancements for pedestrian traffic are also possible.

v. System Elements and Conditions

Coddington Road experiences a low level of commuter hour congestion which is similar to other local collector streets. This project will not affect other projects in the area with regards to coordination of maintenance and protection of traffic, detours, or the movement of people and goods.

The City of Ithaca is proceeding with reconstruction of the South Aurora Street Bridge over NY Route 79 and Six Mile Creek beginning in the 2007 construction season and will continue into 2008. This project is located approximately 1200 meters (3/4 miles) to the north of the Coddington Road project at the north end of Hudson Street. This project should not have a dramatic effect on the area traffic patterns during the reconstruction of Coddington Road.

w. Historical Properties

During the early stages of the project planning, a study of "historical" properties was commissioned by the Town of Ithaca in the fall of 1997 and presented to Tompkins County. This list contained 38 separate properties which were built prior to 1956 and according to this report were to be considered "historical" structures. Of the 38 properties mentioned above 16 were built prior to 1900.

Since then, a formal Cultural Resource Study was completed in accordance with NYS and Federal procedures. The results of this study indicates that while these structures do in fact exist along the project, only one of them (house 999 Coddington Road) has been maintained in a suitable fashion (i.e. the original appearance and character of the structure has been sufficiently preserved) to retain a "historically significant" status. The report further states that there are no other historically significant properties located within the project limits. The Cultural Resource Study is available as a companion document.

x. Environmental Integration

There is a parallel pedestrian "Hike and Bike" trail that is located just east of Coddington Road. This trail is located along the historic Ithaca-Owego railroad bed which was chartered in 1828. The trail is directly adjacent to the project corridor at the Hudson Street intersection. As the trail continues in a southerly direction, it diverges from Coddington Road significantly.

Approximately 850 meters south of the Hudson Street intersection, the trail crosses Juniper Drive which provides an additional access point to the trail from Coddington Road. The trail access points have minimal way finding signs to direct pedestrians to the trail. Additional historical signs near the trail access points are needed to educate the public about the origins of the trail. Parking near the access points is limited. The trail access needs to be improved to further enhance the man made environment by identifying the trail's existence and encouraging its use.

2. Project Level Needs

a. Pavement Needs

The pavement condition needs to be improved based on the following statements:

(1) Subsurface drainage must be provided to limit the pavement damage caused by frost heaving in the subbase course.

(2) The pavement thickness needs to be brought up to currently accepted design standards to help insure pavement stability through the life of the pavement.

(3) Lane and shoulder width must meet the proposed design criteria.

b. Safety Needs

There are several safety deficiencies which need to be corrected including insufficient sight distances, clear zones, pavement widths, and a lack of guiderail at steep drop offs and culvert locations. Despite the low number of total accidents summarized in Table II-12b, the accident rates at certain intersections along the project are substantially higher than the state wide average for similar intersections.

Poor sight distance is the likely cause of a majority of these accidents. There is also a need for safer travel ways for bicycle and pedestrian traffic. Currently, the gravel shoulders do not provide an adequate space for bicycle traffic. Cyclists often use the vehicular lanes disrupting motorized traffic flow.

There is also a need for safe additional parking at the north end of the project.

There is a need to reduce vehicular exposure to non traversable slopes and steep drop offs due to a lack of guide rail at several larger culvert locations throughout the project. Nineteen of the 26 culverts along the project limits are 600mm (24") or larger. Only one of these culverts contains guiderail protecting steep drop-offs and the associated "non-bypassable" lateral hazards at each location.

Additional traffic calming measures are needed to help control vehicular speed.

c. Structural Needs

There are no major structures within the project limits. However any existing cross culverts (pipes) with deficiencies need to be replaced with cost effective materials and construction techniques that meet minimum design requirements. There are 26 cross culverts within the project limits that are in need of replacement either due to condition or inadequate capacity. Most of the cross culverts consist of steel pipes, hand laid field stone head walls with no end sections to help channel and defuse the flow of water in and out of the pipes. Some locations have eroded the stream bedding material creating large drop offs below the bottom of the pipe outfall. Some of the larger cross culvert pipes have visible signs of corrosion, crushing and joint separation/failure.

d. Capacity Needs

Coddington Road currently has adequate capacity and is operating at a high Level of Service. The population growth is relatively low based on the 2002 US Census Data provided by the Town of Ithaca. Therefore no capacity issues are anticipated before the design year 2027. However the overall condition of the existing pavement will have an adverse affect on the roadway capacity and its ability to efficiently convey traffic.

e. Environmental Needs

There are no practical opportunities for environmental initiative actions that should be addressed within the scope of this project. The new storm water system will meet the water quality and quantity requirements of the NYSDEC regulations. The required erosion and sedimentation control mitigation measures for construction activities will be incorporated into the project design. The only enhancement to the natural or manmade environment above and beyond the required mitigation measures that could be addressed as part of this project is the access enhancement to the adjacent hike and bike trail as described in the above section entitled "Environmental Integration".

3. Area Needs

a. System Needs

Coddington Road is an important Collector that conveys traffic to and from the City of Ithaca from the surrounding highway network. There is a need to improve this important commuter link.

East King Road, in conjunction with Burns Road, serves as an important east-west link between Routes 96B and 79 in this portion of Tompkins County. Utilizing this link requires commuters to enter Coddington Road briefly to transition from East King to Burns Road since they are offset by about 100 meters. Performing safety improvements along Coddington Road will also improve the quality and safety of this commuter link.

The Hudson Street intersection is also an important node along this corridor. It serves as a gateway between the Town and the City of Ithaca.

b. Mobility Needs

(1) Safe bicycle lanes are needed for the relatively large volume of bicycle traffic on Coddington Road. The Draft Town of Ithaca Transportation plan has identified the provision of bicycle accommodations along

Coddington Road from Ithaca College to Troy Road as a "high priority": and from Troy Road to the Danby Town line as a "medium priority".

(2) Sidewalks and other safe pedestrian facilities such as crosswalks are needed in areas with high demand. The Draft Town of Ithaca Transportation Plan has identified Coddington Road from Hudson Street to the Ithaca College entrance as an "essential corridor" for pedestrians with "immediate need" for pedestrian facilities.

c. Adjacent Land Use Needs

(1) The impact to the surrounding properties along Coddington Road needs to be minimized to maintain the character of the area.

4. Public Input

To date, four public information meetings have been held. The first meeting was to gather information from the community and to determine the public's perception of the most important issues to be addressed. The attendees were first given a brief overview and history of the project and then an opportunity to ask questions. The attendees were then invited to participate on one of four smaller groups to offer comments and/or concerns that they had. See *Appendix B* for complete meeting minutes, including questions and corresponding answers. Notes for the four individual discussion groups can also be found in *Appendix B*.

The second public information meeting had two main purposes; first, give the community an update on the project development and second to solicit feedback on the alternatives presented at the meeting. After receiving a brief update of the project and a technical review of the alternatives being presented, the public was given an opportunity to ask questions and make comments. Complete meeting minutes with the questions, answers and comments can be found in *Appendix B*.

In addition, attendees were asked to complete a written project survey. A total of 58 meeting attendees filled out and returned surveys. The survey responses were broken down into two groups; respondents who were residents or property owners along Coddington Road and those who were not. The results of the survey clearly show that most of the residents did not feel the entire project needed to be completed at this time and that most of the non residents did feel that the entire project should be completed. Despite this clear discrepancy in opinion, the overwhelming response was that two sections within the project limits which have been identified as the "Burns/East King Road intersection" and "Juniper Drive to the north limit" did receive very similar and clear rankings as the top two "priority" areas of the project. Other more intangible factors such as project needs and safety deficiencies received a prioritized response which was fairly consistent between the residents/property owners and the non resident/property owner

respondents. The rate of speed along Coddington Road is a big concern to the public. Forty five of the 53 respondents (who answered this question) were in favor of lowering the speed limit along Coddington Road and only 8 were not in favor. Most of the respondents who were in favor of lowering the speed limit were residents/property owners of Coddington Road. The respondents who were not in favor of lowering the speed limit were split evenly between residents/property owners and non-residents/property owners.

Our conclusions based on this data from the public meetings are that the public believes the following:

1. Safety deficiencies, traffic calming, and bicycle/pedestrian accommodations are high priority "Needs" for the project.
2. The "Burns Road/East King Road" and "Juniper Drive to the north limit" sections of the project are the highest "priority sections" of the project.
3. Speed Reduction, intersection safety and sight distance improvements are the highest safety priorities for the project.

Table II-16 is a summary of the survey results.

		Overall Percentage	Coddington Road Residents	Non-Residents
Do you think the entire project should be completed?	**Yes**	19%	8%	50%
	No	81%	92%	50%
Rank the following Project Needs: (1 highest, 7 lowest)		**Average Rank**		
Correct safety deficiencies		2.1	2.9	1.9
Provide traffic calming measures		2.9	3.8	3.7
Provide a walkway along Coddington Road in the vicinity of the Ithaca College entrance		3.4	4.5	2.9
Provide bicycle/pedestrian accommodations		3.7	5.0	2.9
Restore pavement to a good condition		3.8	5.2	3.7
Minimize maintenance and repair costs		4.6	6.1	5.4
Provide an on-street parallel parking lane along Coddington Road in the vicinity of the Ithaca College entrance		6.0	8.2	6.1
Rank in order of priority the following sections of the project based on today's presentation: (1 highest, 7 lowest)		**Average Rank**		
Burns/E. King Vicinity		1.5	2.0	2.1
Juniper Drive to Hudson Ave (City Limit)		2.1	2.7	2.1
Troy Road to Juniper Drive		3.5	4.9	3.3
E. King to Troy Road		3.7	5.0	3.8
Danby Town line to Burns Road		4.3	5.8	4.5

Table II-16 – Public Survey Results Summary

		Overall Percentage	Coddington Road Residents	Non-Residents
Rank in order of priority the following safety deficiencies: (1 highest, 7 lowest)		**Average Rank**		
Speed reduction		1.8	2.4	2.6
Intersection safety		2.1	2.8	2.1
Sight distance		2.9	3.9	2.2
Awareness of deer		3.3	4.4	2.6
Room for emergency stopping along roadside		4.2	5.7	4.0
The respondent is:		**Overall Percentage**	**Coddington Road Residents**	**Non-Residents**
Resident/property owner along Coddington Road		76%	100%	0%
Non-resident/property owner along Coddington Road		24%	0%	100%
Are you in favor of a lower speed limit along Coddington Road?	**Yes**	85%	90%	66%
	No	15%	10%	34%
Are you in favor of the proposed Hudson - Coddington intersection reconfiguration?	**Yes**	57%	54%	63%
	No	43%	46%	34%

Table II-16 – Public Survey Results Summary (continued)

The third meeting updated the public on the direction of project design given studies to date and budgetary constraints. At that point the County proposed alternative 3, to first reconstruct Burns Road/East King Road and Juniper Drive to the north limit followed by the remaining portions when funding allowed. The formal presentation included a brief technical review, a discussion of traffic calming methods allowed by Federal standards (AASHTO), and a presentation of one possible traffic detour to be in place during construction. The attendees were then allowed to make comments and ask questions. Complete meeting minutes with the questions, answers and comments can be found in *Appendix B.*

In Brief (third meeting):

1. Comments on the Burns Road/East King Road section were consistent with the previous meeting. The community members still felt that improving safety in this area is a priority.
2. There was an overwhelming negative response to the inclusion of a parking lane in the Juniper to the north limit section.
   - The public felt that a parking lane was not warranted because there appears to be sufficient off street parking with existing conditions.

- There was concern that if parking was moved from off-street to on-street, non-resident use of the facilities would result in insufficient parking for the residents.
- The public did not feel comfortable with parallel parking on only one side of the road. They were concerned that vehicles trying to turn around to travel south would present a safety issue.
- The public expressed concern that the increased width of a section with a parking lane would only add to the issues of speeding vehicles.

Although it is not the Town's current policy to allow front yard parking as exists at the homes near Ithaca College, these parking areas are grandfathered and may remain.

A fourth meeting was held to update the public of minor changes and to present two options for traffic calming at Burns Road and East King Road. After receiving a brief review of the project needs, the public was informed of the recent project changes. The public was made aware that the project schedule was revised. The County decided to reconstruct the south section of Coddington Road, south of Troy Road, first and then reconstruct the northern portion at a later date when additional funds became available. Other project changes included the concrete gutter being located partially in the shoulder area and the addition of retaining walls in some areas to limit tree and yard impacts. The public was also presented with photos of several typical sections and photo simulations representing the proposed corridor. The attendees were then allowed to make comments and ask questions.

The two options discussed for traffic calming at Burns and East King Roads were channelization and a roundabout. Each discussion was followed by public questions and comments. Complete meeting minutes with the questions, answers and comments can be found in *Appendix B.* In general the public was not particularly in favor of either traffic calming plan.

D. Project Objectives

The principal objectives of this project are as follows:

1. Restore the pavement to a good condition using effective techniques that will minimize the life cycle costs of maintenance and repairs.

2. Accommodate pedestrians and bicyclists in a cost effective manner.

3. Enhance safety by using cost effective accident reduction, traffic calming and speed reduction techniques.

4. Minimize the impact to the adjacent properties due to grade changes in cut/fill areas along Coddington Road and minimize the size of all ROW acquisitions.

CHAPTER III
ALTERNATIVES

FINAL DESIGN REPORT

CODDINGTON ROAD
(COUNTY ROUTE 119)

DANBY TOWN LINE TO CITY OF ITHACA LINE

TOWN OF ITHACA
TOMPKINS COUNTY, NEW YORK

NYSDOT PIN 3753.24

AUGUST 2007

III ALTERNATIVES CONSIDERED AND EVALUATIONS

A. Design Criteria

1. Standard Design criteria for Coddington Road are based on the NYS Highway Design Manual (HDM). However, several of the proposed Main Line Design Criteria listed below do not meet the requirements of HDM Chapter 2. Based on the project needs, the existing conditions, traffic data, accident data, the proposed design criteria incorporate traffic calming measures such as narrower shoulders, maintaining mature trees within the clear zone and a lower design speed. Chapter 25 of the Highway Design Manual states that this type of deviation is allowed based on traffic calming needs and proposed measures. *Table III-1* summarizes the Critical Design Elements for the project.

B. Alternatives Considered

Six alternatives were considered: 1) Null Alternative, 2) the 90 km/h (55 mph) Design Speed Alternative, 3) the 70 km/h Design Speed Alternative, 4) the Improve the Highway In Kind Alternative, 5) the 70 km/h Design Speed Alternative plus additional Intersection Traffic Calming, 6) the 60-70 km/h Design Speed with no additional Intersection Traffic Calming. Also, several sub-alternatives related to specific intersection designs were also considered.

1. Null Alternative

This alternative would propose no improvements to Coddington Road. It would not add any new features to the existing corridor. Furthermore, it would allow present deficiencies to remain and would allow the pavement deterioration to continue.

This alternative would not address the existing safety issues such as the poor sight distances and narrow pavement widths. The high accident rates along the project corridor would not be addressed. Bicyclists, who are currently forced to travel in the vehicular lanes, would be forced to continue to do so. Pedestrians in high demand areas would be forced to walk along the narrow gravel shoulders with no designated walkway.

Also, visual inspection and geotechnical investigation revealed that the existing pavement and shoulders are in poor condition. Pavement thicknesses are

Main Line Design Criteria									
Element		**South Limit to Burns Road – Except for the vicinity of the Community Center (Rural Collector)**		**The vicinity of the Community Center (Rural Collector)**		**Burns Road to Juniper drive (Urban Collector, uncurbed)**		**North of Juniper Drive to North Limit (Urban Collector, curbed)**	
		NYSDOT HDM Chapter 2	**Proposed**	**NYSDOT HDM Chapter 2**	**Proposed**	**NYSDOT HDM Chapter 2**	**Proposed**	**NYSDOT HDM Chapter 2**	**Proposed**
a	Design Speed	90 km/hr	70 km/hr	90 km/hr	60 km/hr	90 km/hr	70 km/hr	70 km/hr	60 km/hr
b	Lane Width	3.3 m (11ft) ADT = 1076	3.3 m (11ft) ADT = 1076	3.3 m (11ft.) ADT = 1076	3.3 m (11ft) ADT = 1076	3.3 m (11ft) ADT = 1076	3.3 m (11ft) ADT = 1076	3.3 m (11ft.) ADT = 3202	3.3 m (11ft) ADT = 3202
c	Shoulder Width	1.5 m (5ft)	1.2 m (4ft)	1.5 m (5ft)	1.2 m (4ft)	1.5 m (5ft)	1.2 m (4ft)	1.5 m (5ft)	1.2 m (4ft)
d	Grade	8.0% (max.)	8.0% (max.)	8.0% (max.)	8.0% (max.)	7.0% (max.)	8.0% (max.)	9.0% (max.)	10.0% (max.)
e	Horizontal Curvature	336 m (min.)	184 m (min.)	336 m (min.)	123 m (min.)	336 m (min.)	184 m (min.)	203 m (min.)	135 m (min.)
f	Superelevation Rate	6.0% (max.)	6.0% (max.)	6.0% (max.)	6.0% (max.)	6.0% (max.)	6.0% (max.)	4.0% (max.)	4.0% (max.)
g	Stopping Sight Distance	160 m (min.)	105 m (min.)	160 m (min.)	85 m (min.)	160 m (min.)	105 m (min.)	105 m (min.)	85 m (min.)
h	Horizontal Clearance	3.0 m (10ft)	3.0 m (10ft)	3.0 m (10ft)	3.0 m (10ft)	3.0 m (10ft)	3.0 m (10ft)	0.5 m (1.6ft)	0.5 m (1.6ft)
i	Vertical Clearance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
j	Pavement Cross Slope	2%	2%	2 %	2%	2%	2%	2%	2%
k	Rollover between lanes Rollover at edge of traveled way -	4.0% (max.) 8.0% (max.)	4.0% (max.) 8.0% (max.)	4.0% (max.) 8.0% (max.)	4.0% (max.) 8.0% (max.)	4.0% (max.) 8.0% (max.)	4.0% (max.) 8.0% (max.)	4.0% (max.) 8.0% (max.)	4.0% (max.) 8.0% (max.)
l	Structural Capacity –	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
m	Level of Service	D (min.)	D (min.)	D (min.)	D (min.)	D (min.)	D (min.)	D (min.)	D (min.)
n	Control of Access	uncontrolled	uncontrolled	uncontrolled	uncontrolled	uncontrolled	uncontrolled	uncontrolled	uncontrolled
o	Pedestrian Accommodations	Comply w/ ADA & HDM Ch 18	Comply w/ ADA & HDM Ch 18	Comply w/ ADA & HDM Ch 18	Comply w/ ADA & HDM Ch 18	Comply w/ ADA & HDM Ch 18	Comply w/ ADA & HDM Ch 18	Comply w/ ADA & HDM Ch 18	Comply w/ ADA & HDM Ch 18
p	Bicycle Lane Width	1.2 m (min.)	1.2 m (min.)	1.2 m (min.)	1.2 m (min.)	1.2 m (min.)	1.2 m (min.)	1.2 m (min.)	1.2 m (min.)

Table III-1 Design Criteria

substandard with many areas containing an asphalt pavement thickness of only 90mm (3.5"). Continued deterioration will lead to total failure of the roadway. Many of the existing cross culverts are in poor condition, are undersized and contain no guiderail protection where necessary.

The only project objective that the null alternative would meet would be minimizing the impact to the adjacent properties and does not address any of the safety concerns. Based on this fact, the null alternative has been eliminated from further consideration.

2. Improve the Highway to Standards Alternative - 90 km/h (55 mph) Design Speed

This alternative would require travel lanes to be 3.3 meters (11 feet) wide and the shoulders to be 1.5 meters (5ft) wide. This alternative would result in a 9.6 meter (32 foot) pavement cross section (not including curbs or gutters). Installation of a closed drainage system would eliminate the need for road side ditches and thus limit the overall roadway width increase. The closed drainage system will also incorporate a combined storm/underdrain system designed to transmit storm drainage and capture subsurface drainage and protect the pavement structure from saturation and frost heave.

The existing horizontal alignment of Coddington Road in general would be maintained. However in order to provide minimum required sight distances, the vertical alignment would need to be altered significantly. Most of the existing vertical curves which contain poor sight distances would need to be lengthened to "flatten" the roadway, lowering or raising the grade as much as 2 meters (6.5 ft) in some locations to accommodate the 90km/hr design speed. In order to fit the longer vertical curves along the roadway, the vertical alignment would need to be altered to the point of actually reversing the direction of several tangent slopes which would alter the character of several of the drainage areas along the project. These alterations would result in re-grading of the proposed side slopes outside the right of way limits as much as 17± meters in the worst cases.

Sight distance improvements would be implemented along the entire project including at key locations and intersections such as the Burns Road/ East King Road intersection and the Updike Road intersection. Other improvements would include cross culvert replacement throughout the project as necessary to accommodate vertical grade adjustments as well as culvert capacity and condition concerns.

In the section near the Ithaca College entrance, this alternative would provide on-street parking and pedestrian facilities. In this area an expanded cross section would retain the 3.3 meter (11 foot) travel lanes and 1.5 meter (5 foot) shoulders/bicycle lanes, but would also include a 2.1 meter (7 foot) parking lane

and a 2.1 meter (7 foot) sidewalk on the east side of Coddington Road. The added parking lane would provide about one third more parking than currently available with off street parking. The sidewalk would bring continuity to the existing hiking trail east of Coddington Road by providing a "closed loop" between the northern end of the hike and bike trail near the City line and the intersection of Juniper Drive. The proposed sidewalk would also connect the Ithaca College walkway and neighboring off-campus housing to the existing sidewalk just north of the project limits within the City of Ithaca.

The above described section would span the area with the greatest parking demand - approximately Station 5+280 to Station 5+840. The sidewalk would continue south to Juniper Drive and north to the City of Ithaca line. However the parking lane would only be within the noted limits.

Construction Costs

The cost to construct Alternative 2 has been estimated to be $10,830,000.

a. Large cuts and fills would result in a greater cost for earthwork.
b. The increased width of area disrupted (from both earthwork and increased roadway width) would require extensive and costly Right of Way acquisitions.
c. Major deviations from the existing terrain would require additional adjustment/replacement of existing utilities.
d. The use of pavement recycling techniques would be much less attractive due to the greater need to stockpile the existing road materials during extensive roadway grade adjustments.

The approximate ROW acquisition cost for Alternative 2 would be $166,000. Since this alternative was dismissed early in the planning process, a detailed ROW estimate was not prepared for this alternative. However this estimate has been approximated to be 25% higher than the detailed ROW estimate which has been prepared for Alternative 3.

This alternative would disturb a foot print with severe impacts to the adjacent properties and would result in more substantial and unacceptable ROW takings. The accident history along Coddington Road does not warrant this level of improvement. Considering the large cuts and fills required to accommodate the 90 km/hr design speed, the economic costs involved, and the resulting neighborhood, social, and environmental impacts, this alternative is not considered feasible. For plans and profile of this alternative, see *Appendix A*.

3. Improve the Highway with Selected Improvements 70 km/h (45 mph) Design Speed - Alternative

Note: This alternative was presented as the preferred alternative at the time of the second and third public meetings.

This alternative would mostly maintain the existing horizontal alignment of Coddington Road. The existing vertical alignment would be altered to provide adequate sight distances. In most locations this would be achieved with no more than 0.25± meters deviation from the existing elevation. Certain "trouble" areas (e.g. from Sta. 1+700 to Sta. 1+950, the area of Burns Road & East King Road, etc.) would have more severe vertical changes to provide adequate sight distances. However, the deviations in elevation in these locations would be much less than if a 90km/h (55mph) design speed was implemented. This alternative is considered a "traffic calming" alternative with a narrower pavement section, a lower design speed and less stringent sight distance requirements than Alternative 2. These deviations from the more conventional design standards are in compliance with the guidance contained in Chapter 25 of the Highway Design Manual.

The 70 km/h design speed alternative would provide 3.3 meters (11 feet) travel lanes. The typical section would include 1.2 meter (4 foot) paved shoulders on both sides of the road to accommodate bicycle traffic (and pedestrian traffic in the southern portion of the project). *Table III-2* identifies the pavement and shoulder widths as well as the proposed parking lane and sidewalk limits for the entire alternative.

Station Range	Lane Width	Shoulder Width	Parking Lane (NB side only)	Sidewalk (NB side only)
Southern limit to Updike Road 1+000 to 1+650	3.3m	1.2m	n/a	n/a
Updike Road to East King Road Intersection 1+650 to 2+750	3.3m	1.2m	n/a	n/a
East King Road to Juniper Drive 2+750 to 5+150	3.3m	1.2m	n/a	n/a
Juniper Drive to the City Line 5+150 to 5+980	3.3m	1.2m	1.2m*	2.1 m**

Table III-2 Station, Line, Grade and Pavement/Sidewalk Widths

* Parking Lane from Station 5+280 to Station 5+840

** Sidewalk from Station 5+165 to Pennsylvania Avenue

A closed drainage system would be installed in most locations, eliminating the need for the vast majority of the road side swales and thus further reduce the overall width of the roadway corridor. The closed drainage system will also incorporate a combined storm/underdrain system designed to recharge, store and transmit storm drainage and capture subsurface drainage and protect the pavement

structure from saturation and frost heave.

It is not uncommon for a local road or collector like Coddington Road to experience operating speeds far in excess of the speed limit or the desired operating speed. The application of the following traffic calming techniques will help reduce operating speeds along the project:

1. The elimination of open ditches, which will provide a narrower roadway section than otherwise necessary.
2. The use of a narrowed pavement section.
3. The use of colored shoulder surfaces to further enhance perceived narrowness of driving lanes.
4. The use of landscaping to create a more enclosed feel to the corridor.
5. The use of pedestrian accommodations such as sidewalk and curbing in limited areas.
6. The use of special signage identifying the corridor as a traffic calming zone.
7. The use of alternative paving textures or colors to alert the driver of a change in operating conditions.

Application of the methodology in Chapter 2 of the HDM would produce a design speed comparable to the existing speeds. However, consistent with the spirit and intent of the design speed discussion in the 1994 AASHTO "A Policy on Geometric Design of Highways and Streets", page 62, it may be acceptable and consistent with good engineering practice to progress, as exceptions to design standards, a design which will lower the anticipated operating speed. This design tactic is not based on safety issues but rather is intended as a traffic calming technique.

Burns Road / East King Road

After reviewing the accident history, existing sight distances and Level of Service analysis, the improvement of the sight distance along Coddington Road was identified as one of the most effective methods to improve the safety of the Burns Road / East King Road intersection. This alternative would provide a minimum sight distance of 105 meters which is consistent with the 70km/h design speed. In the vicinity just south of the Burns Road / East King Road intersection (station 2+150 to 2+750), the most severe change in grade from the existing ground to the proposed vertical alignment would be approximately 1 meter (3.3ft) cut. Several of the traffic calming measures discussed above will be implemented in the vicinity of the Burns Road / East King Road intersection in an effort to control traffic speeds along the corridor.

The grade at Burns Road would be raised about 0.7 meters (2.2 ft). This change in grade will force some re-grading along Burns Road as well. To facilitate this vertical change, the horizontal alignment will also need to be shifted approximately 4 meters south to avoid impacting the adjacent creek located along

the north side of Burns Road. The area along the south side of Burns Road in this vicinity is a steep upward slope which can be cut back to accommodate this shift with minimal impact to the adjacent property.

During the preliminary planning the option of realigning Burns Road to the north to create a four-way "tee" intersection with East King Road was explored. However it was determined that this option would require the construction of approximately 0.23 kilometers of new road and an additional box Culvert to cross the adjacent creek and would slightly reduce the level of service of the intersection. *Table III-3* shows the level of service associated with this reconfiguration.

Burns Road / East King Road Alternative (Four-Way Intersection) 2027 Level of Service			
		AM	PM
Northbound	LTR	A	A
Southbound	LTR	A	A
Westbound	LTR	B	B
Eastbound	LTR	B	B
Overall		**A**	**B**

Table III-3

This sub alternative would require a substantial amount of Right of Way taking and would not further improve the safety or operational efficiency of the intersections. This sub-alternative was therefore dismissed. The current alternative keeps the Burns Road and East King Road intersections more or less in their current horizontal configuration.

Consideration was given to introducing stop signs along Coddington Road at the Burns Road and East King Road intersections. For simplicity purposes (based on the traffic data that was available) the Burns Road and East King Road intersections were considered to be one intersection for the purpose of this analysis. Based on the conditions set forth in the New York State Manual of Uniform Traffic Control Devices (NYS-MUTCD), it was determined that the traffic conditions at these intersections do not meet the requirements to warrant 4-way stop control. *Table III-4* summarizes the required conditions and the traffic conditions present at Burns / E. King. (Note that all three conditions would have to be met to warrant a 4-way stop control.)

Description	Conditions Required to Warrant a 4-Way Stop Control	Traffic Conditions of the Burns Road and E. King Road Intersection	Meets Warrant Condition
Total Number of Vehicles Entering the Intersection During the Peak 8-Hour Period (Vehicles)	2800	1481 (2004) 1651 (2027)	No No
Total Number of Vehicles Entering the Intersection From the Side Road During the Peak 8-Hour Period (Vehicles)	1100	681 (2004) 759 (2027)	No No
Longest Side Road Delay for any One Hour Period (Seconds)	30	12.8 (2004) 13.8 (2027)	No No

Table III-4, Conditions and Requirements Warranting a 4-Way Stop Condition

Traffic data at the Burns Road intersection and the East King Road intersection was updated in 2007. The NYSDOT has reviewed this updated data and has concluded that no modifications to the proposed intersection designs are necessary. See *Appendix B* for this correspondence.

Juniper Drive to City Line

In the high demand area near the Ithaca College entrance, this alternative will provide on-street parking and pedestrian facilities. In this area an expanded cross section was developed. This section retains the 3.3 meter (11 foot) travel lanes and 1.2 meter (4 foot) shoulders/bicycle lanes. However, this section would also include a 2.1 meter (7 foot) parking lane on the east side of Coddington Road as well as a 2.1 meter (7 foot) sidewalk, on the same side. The standard sidewalk width is 1.52 meter (5ft), but this alternative recommends installing a 2.1 meter wide sidewalk to provide snow storage capability. The added parking lane would provide about one third more parking than currently available with the existing off street parking. The sidewalk along Coddington Road would bring continuity to the existing hiking trail east of Coddington Road by providing a "closed loop" between the northern end of the hike and bike trail near the City line and the intersection of Juniper Drive. The sidewalk would also connect to the existing sidewalk just north of the project limits within the City of Ithaca. The proposed sidewalk would connect existing pedestrian facilities from the north (Hudson St), south (hiking trail via Juniper Dr.), and east (undeveloped trails serving off-campus housing) whereby pedestrians could safely access Ithaca College. A crosswalk near the Ithaca College entrance is also proposed to connect the sidewalk with a campus walkway that ends at the west side of Coddington Road.

This section of the project spans the area with the greatest parking demand. The proposed sidewalk would extend from the southern limits of this project segment at Juniper Drive to the termination of the existing sidewalk just north of the City

of Ithaca line on Hudson Street. The parking lane would only be between station 5+280 and station 5+840.

Introducing a parallel parking lane along the east side of Coddington Road will create other potential conflicts with vehicles maneuvering into and out of parking positions along the roadway, but these are normal and visible conflicts which motorists are regularly exposed to in similar urban environments. Vehicles in the normal traffic flow will be forced to occasionally wait for vehicles to complete a parking maneuver, but these delays are infrequent, brief and are considered to have a traffic calming effect. The proposed condition is more desirable than motorists backing out into traffic from random and undesirable (from a zoning perspective) locations along the northern section of the project as depicted by the existing condition.

Because of the extra width of these sections (either with both parking and sidewalk or with sidewalk alone), the horizontal alignment would need to shift about 3.5 meters west of the existing centerline. This will not only allow the section to better fit within the Right of Way, but also better aligns the proposed roadway corridor to the existing topography reducing the number and severity of the Right of Way takings. Also, by using curb on both sides of the roadway the width of the section is minimized, thus further reducing impacts to the Right of Way.

Placing the sidewalk on the west side and parking on the east side of Coddington Road was evaluated and rejected because this arrangement does not promote the best safety conditions for people parking their cars and then proceeding to their destinations.

Hudson Street Intersection

The proposed sidewalk will continue across the City of Ithaca line along Hudson Street to the north side of Pennsylvania Avenue and connect with the existing sidewalk.

Currently, Coddington Road forms a "wye" intersection with Hudson Street at the north end of the project. Coddington Road veers to the west as you travel north and Hudson Street veers more easterly. The Coddington Road to Hudson Street movement currently acts as the dominant traffic maneuver. Input from the public suggested reconfiguration of this intersection to create more definition to the intersection and encourage the Coddington Road to Coddington Road movement as a more dominant maneuver. The main goal of this reconfiguration would be to calm traffic passing through this area which is transitioning between a more rural environment to the south and the urban environment to the north.

The reconfiguration would consist of realigning Hudson Street to force a small turning movement in order to proceed north along Hudson Street from Coddington Road. Since the majority of the intersection falls within the City of Ithaca limits, funding and support from the City would be necessary to further this portion of the project alternative. However, the City of Ithaca does not think that this work is of sufficiently high priority to support it financially at this time and so it is no longer part of Alternative 3.

Construction Costs

The cost to construct Alternative 3 has been estimated to be $10,805,000. Based on the preliminary plans, profiles and cross sections which were developed to evaluate Alternative 3, a preliminary ROW cost estimate has been prepared which summarizes approximate ROW takings for this alternative and includes the approximate cost of each taking. The Approximate ROW acquisition cost for Alternative 3 would be $133,000. See *Tables III-4 and III-5* for further summary information on Construction and ROW costs. See *Appendix E* for detailed Construction and ROW costs for Alternative 3. For plans, profiles and typical cross sections of this alternative see *Appendix A.*

4. Improve the Highway In-Kind - Alternative

This alternative would maintain the existing horizontal and vertical alignment of Coddington Road. This alternative would provide 3.0 meter (10 feet) travel lanes and 0.9 meter (3 feet) paved shoulders on both sides of the road, essentially matching the cross-section requested in resolution previously passed by the Town of Ithaca. This would represent a decrease in shoulder width from the gravel shoulders that exist typically today.

The pavement would be reconstructed to the existing width and grade and the existing open drainage system would be maintained. This alternative would incorporate an underdrain system designed to capture subsurface drainage and protect the pavement structure from saturation and frost heave. The existing cross culverts would be replaced and guiderail protection would be installed where necessary.

This alternative would not address the majority of the existing safety issues such as the poor sight distances and narrow pavement widths. The high accident rates along the project corridor would not be addressed. Bicyclists, who are currently forced to travel in the vehicular lanes, would be forced to continue to do so. Pedestrians in high demand areas would be forced to walk along the narrow shoulders with no designated walkway. This alternative would not address parking issues at the north end of the project.

The cost of construction for this alternative has been estimated at $8,104,000 or 75% of Alternative 3 due to the narrower pavement section and lack of grade changes required.

Project objectives that the In Kind Replacement Alternative would meet would be minimizing the impact to the adjacent properties, restoring the pavement to a serviceable condition and traffic calming/speed deduction through the use of a narrowed pavement section. However, it would not address the vast majority of the safety concerns. In addition, this alternative does not meet the geometric standards required by the state and federal highway administrations and as such the project would not qualify for the state and federal funding currently designated for the project. Based on these facts Alternative 4 (In Kind Replacement Alternative) has been eliminated from further consideration.

5. Improve the Highway with Selected Improvements Plus Intersection Traffic Calming 70 km/h (45 mph) Design Speed - Alternative

Note: This alternative was presented as the preferred alternative at the fourth public meeting with the construction phase split at Troy Road with the intention of creating and consulting with a Citizens Advisory Group prior to making any recommendations for improvements at the north end.

This alternative would mostly maintain the existing horizontal alignment of Coddington Road. The existing vertical alignment would be altered to provide adequate sight distances. In most locations this would be achieved with no more than 0.25± meters deviation from the existing elevation. Certain "trouble" areas (e.g. from Sta. 1+700 to Sta. 1+950, the area of Burns Road & East King Road, etc.) would have more severe vertical changes to provide adequate sight distances. However, the deviations in elevation in these locations would be much less than if a 90km/h (55mph) design speed was implemented. This alternative does include non-standard design features such as: a narrower pavement section, lower design speed and less stringent sight distance requirements than Alternative 2. However, as discussed in the description of Alternative 3, these deviations from the more conventional design standards are in compliance with the guidance contained in Chapter 25 of the Highway Design Manual.

The 70 km/h design speed alternative would provide 3.3 meters (11 feet) travel lanes. The typical section would include 1.2 meter (4 foot) paved shoulders on both sides of the road to accommodate bicycle traffic. From the south limit to Juniper Drive the typical section would be an open section which would include either gutters or shallow swales to collect storm water as required. From Juniper Drive to the north limit the typical section would include curbs on both sides of the roadway.

A closed drainage system would be installed in most locations, eliminating the

need for the vast majority of the road side ditches and thus further reduce the overall width of the roadway corridor. The closed drainage system would also incorporate a combined storm sewer/underdrain system designed to recharge, store and transmit storm drainage and capture subsurface drainage and protect the pavement structure from saturation and frost heave.

The following traffic calming measures can be incorporated into the design:

1. The elimination of open ditches, which will provide a narrower roadway section than otherwise necessary.
2. The use of a narrowed pavement section.
3. The use of colored shoulder surfaces to further enhance perceived narrowness of driving lanes.
4. The use of landscaping to create a more enclosed feel to the corridor.
5. The use of curbing in limited areas.
6. The use of special signage identifying the corridor as a traffic calming zone.
7. The use of alternative paving textures or colors to alert the driver of a change in operating conditions.
8. The construction of roundabouts at selected intersections.

South Section (South Limit to East King Road to Juniper Drive)

As discussed in Alternative 3, the improvement of sight distance along Coddington Road was identified as one of the most effective methods to improve its overall safety. Therefore, this alternative would also provide a minimum sight distance of 105 meters, which is consistent with the 70 km/h design speed. To achieve the minimum sight distances the vertical alignment would need to be improved at all the existing vertical curves that do not meet the standard, as identified in *Table II-2, Existing Vertical Sight Distances.* The most severe change in grade, from existing to proposed, is about 1.28 meters (4.2 feet). *Table III-5* shows approximate changes in grade required, at selected locations along the southern portion of the project, needed to improve sight distances.

Station	Existing Centerline Elevation (meters)	Proposed Centerline Elevation (meters)	Change in Elevation meters (feet)
1+460	309.28	308.74	-0.54 (-1.77)
1+510	307.01	307.51	+0.50 (1.64)
1+580	307.39	306.64	-0.75 (-2.46)
1+700	305.87	304.84	-1.03 (-3.38)
1+750	303.28	302.17	-1.11 (-3.64)
1+850	296.91	298.19	+1.28 (4.2)
1+940	299.08	298.26	-0.82 (-2.69)
2+090	298.12	298.66	+0.54 (1.77)
2+280	298.10	297.00	-1.10 (-3.61)
2+350	294.22	295.17	+0.95 (3.12)
2+420	295.59	295.20	-0.39 (-1.28)
2+670	291.83	291.49	-0.34 (-1.12)
2+790	289.94	290.28	+0.34 (1.12)
2+910	289.82	289.41	-0.41(-1.34)
2+970	288.09	288.67	+0.58 (1.9)
3+030	289.68	289.09	-0.59 (-1.94)

Table III-5, Centerline Grade Comparison

As noted in Alternative 3, the change in grade at the Burns Road intersection would require some re-grading along Burns Road and would be best handled by shifting Burns Road approximately 4-5 meters south.

North Section (Juniper Drive to North Limit)

To facilitate the transition of northbound traffic into a more "city like" feel, granite curb would be introduced starting at Juniper Drive and continue to the north limit. Curb on both sides of the highway will give the roadway a narrower feel and tend to slow traffic down.

As discussed in Alternative 3, it is desirable to improve pedestrian accommodations in the northern portion of the project. This alternative (Alternative 5) will included a 1.5 meter wide sidewalk on the west side of Coddington Road from Ithaca College to the Hudson Street intersection. The sidewalk will be separated from the roadway by a 1.2 meter wide curb lawn, which will provide space for landscaping, as mentioned above. The purpose of the sidewalk is to provide a safer route for pedestrians already traveling between Ithaca College and the City of Ithaca. A crosswalk would be constructed at the end of the proposed sidewalk to provide for safe crossing on Coddington Road, at the Hudson street intersection. New sidewalk would be installed along the east side of Hudson Street until the point where it would connect to the existing City sidewalk.

Sidewalks south of Ithaca College are not included in this alternative. However, sidewalks between Juniper Drive and Ithaca College may be considered in the future for connection to the Hike and Bike path, as discussed in Alternative 3.

Roundabouts

Roundabouts act as a powerful traffic calming device. A roundabout is specifically designed to force vehicles to slow down before they can merge into the circular intersection. As part of this alternative, two locations for roundabouts have been considered for this project.

The first location to be considered is the Burns Road intersection with Coddington Road. The public has strongly expressed concern about speeding along the project corridor. A roundabout at Burns Road would calm traffic without introducing possible safety issues associated with an unwarranted stop signs or a traffic signal. A roundabout at this location would cost an additional $230,000 to construct compared to the intersection construction costs without a roundabout.

The second location considered for a roundabout was at the Ithaca College entrance. Ithaca College entrance is in the more "urban" portion of the project, where there is an increased number of vehicles, the larger concentration of pedestrians and a strong community desire to have slower moving traffic. This roundabout would also incorporate the driveway to 237 Coddington Road into the design. A roundabout at this location would cost an additional $180,000 to construct when compared to the intersection construction cost without a roundabout.

Roundabouts were also proposed by the City of Ithaca at the Hudson Street intersection and by the public at the Troy Road Intersection.

Hudson Street Intersection

A reconfiguration of the Hudson Street – Coddington Road intersection, as discussed in Alternative 3, may still be considered for future development.

Construction Costs

The cost to construct Alternative 5 has been estimated to be $10,031,000 based on the preliminary plans, profiles and cross sections which were developed to evaluate Alternative 5. A preliminary ROW cost estimate has been prepared which summarizes approximate ROW takings for this alternative and includes the approximate cost of each taking. The Approximate ROW acquisition cost for Alternative 5 would be $133,000. See *Tables III-6 and III-7* for further summary information on Construction and ROW costs. See *Appendix E* for detailed Construction and ROW costs for Alternative 5. For plans, profiles and typical cross sections of this alternative see *Appendix A.*

6. Improve the Highway with Selected Improvements with no additional Intersection Traffic Calming 60 km/h (35 mph) to 70 km/h (45 mph) Design Speed - Alternative

Note: As with Alternative 5, this alternative includes the phase split at Troy Road and the Citizens' Advisory Group for the north end.

The alignment and features of Alternative 6 are very similar to Alternative 5. It includes splitting the work into two construction segments at the Troy Road intersection with the section south of Troy Road being built with currently available funds. It also includes a Citizens' Advisory Group for the north end of the project area. The main difference is that the proposed design speed is reduced from 70 km/h (45 mph) to 60 km/h (35 mph) in the vicinity of the Community Center which is located at station 1+650. The design speed remains the same in all other project areas as described in Alternatives 5 and 3. The community has long been in favor of this speed reduction as a traffic calming feature. The Town of Ithaca has recently passed a resolution supporting the reduced speed limit at the Community Center. The 35 mph speed limit was posted in June 2007. The speed reduction is also a cost savings measure since this is the location contains some of the most severe vertical changes necessary to provide adequate sight distances. The NYSDOT has also approved this speed reduction. The design speed for this alternative is reduced to 60km/h (35 mph) between stations 1+460 and 2+030. The minimum stopping sight distance for this section was reduced from 105 meters (350 feet) to 85 meters (283 feet), and the vertical alignment was adjusted between stations 1+470 and 1+990. The proposed grade for this alternative is closer to existing grade, requiring less excavation and embankment quantities. Also, the impacts on the adjacent properties in this area have been reduced. *Table III-6* compares approximate changes in grade required to improve sight distances for Alternatives 5 and 6 in this area.

Station	Existing Centerline Elevation (meters)	Proposed Centerline Elevation (meters)		Change in Elevation (meters)	
		Alt. 5	Alt. 6	Alt. 5	Alt. 6
1+460	309.28	308.74	309.01	-0.54	-0.27
1+510	307.01	307.51	307.49	+0.50	+0.50
1+580	307.39	306.64	307.33	-0.75	-0.06
1+700	305.87	304.84	305.69	-1.03	-0.18
1+750	303.28	302.17	302.68	-1.11	-0.60
1+850	296.91	298.19	297.68	+1.28	+0.77
1+940	299.08	298.26	298.01	-0.82	-1.07
2+090	298.12	298.66	298.04	+0.54	-0.08
2+280	298.10	297.00	297.01	-1.10	-1.09

Table III-6, Centerline Grade Comparison

Alternative 6 proposes a reduced pavement section based on a 30 year design life instead of the 50 year design life proposed in the previous alternatives. This change is also proposed as a cost savings measure. The updated traffic data suggests that the truck volumes are lower than previously quantified. This would result in a design life that is higher than the anticipated 30 years. The total thickness of the asphalt section was reduced from 240 mm (9.5 inches) to 165mm (6.5 inches). The subbase thickness remains unchanged and is equal to 350mm (14 inches).

Alternative 6 proposes the substitution of approximately 1,100 meters (3,667 feet) of concrete gutter with shallow earth swales. This change is also driven by cost savings. The south section of Alternative 6 proposes approximately 36 percent less concrete gutter than Alternative 5. Most of the gutter replacement is proposed between stations 3+330 to 4+200.

Construction Costs

The cost to construct Alternative 6 has been estimated to be $ 8,796,000 based on the preliminary plans, profiles and cross sections which were developed to evaluate Alternative 6, a preliminary ROW cost estimate has been prepared which summarizes approximate ROW takings for this alternative and includes the approximate cost of each taking. The Approximate ROW acquisition cost for Alternative 6 would be $126,000. See *Tables III-7 and III-8* for further summary information on Construction and ROW costs. See *Appendix E* for detailed Construction and ROW costs for Alternative 6. For plans, profiles and typical cross sections of this alternative see *Appendix A.*

C. Feasible Alternatives

1. Description of Feasible Alternative

The objectives of this project will be met in the most effective manner, while limiting impacts to adjoining properties, by providing a new pavement surface that meets minimum design standards, improves the ridability and safety of the roadway and provides facilities for pedestrians and bicyclists.

Alternative 3 met the objectives of the project but it was met with substantial public opposition. This forced the County to prepare additional alternatives which still met the project objectives but **were** more aligned with the community's desires.

Alternative 5 was developed to address the public objections to Alternative 3. Alternative 5 also met the project objectives but certain elements of alternative 5 such as the traffic claming features at the Burns Road intersection were not supported by the public. In addition, there was a need to refine the vertical profile to further limit the impact on the adjacent properties. These refinements were based on the recently implemented school zone and resulting lower speed limit in the vicinity of the Community Center. These changes have resulted in the creation of Alternative 6.

The most feasible alternative is Alternative 6. Alternative 6 would use a design speed of 70 km/h for most of the length of the project and bring sight distances up to acceptable levels. It would provide safe pavement sections for vehicular, pedestrian and bicycle use. It would address the Burns Road intersection and other identified trouble spots south of Troy Road, as well as utilizes a Citizen's Advisory Group to address concerns north of Troy Road during future final design of that section. Finally, it also mitigates impact on neighborhood properties to the greatest extent of all the feasible alternatives.

The existing overhead utilities may in certain locations need to be relocated but the new locations will likely still remain within the clear zone. There are many existing trees which will also remain within the clear zone. These exceptions have been made because there is no accident data that suggests that fixed objects along the roadside have been significant contributors to accidents along the corridor and the fact that these features have been recognized as important traffic calming measures that provide visual relief and physical screening for the residential properties along the roadway.

2. Construction Budget

The overall cost of constructing Alternative 6 from the Danby Town Line to the City of Ithaca Line is approximately $8,796,000. Tompkins County has indicated

that the available construction budget is $4,535,000. It is also anticipated that approximately $300,000 of excess ROW funds can be transferred to construction funding to cover the additional construction costs which yields a total of $4,835,000 of available funding for construction. Alternative 6 is the preferred alternative, but due to a lack of an appropriate amount of construction funds, the project will be separated into two phases with the highest priority portion designed and constructed first, based on the funding available. According to the public surveys and scoping/planning studies performed as part of the report, the vicinity of the Burns Road / East King Road intersection has been identified as the highest priority and will be the focus of the first phase of this project.

The section of Coddington Road north of Troy Road also received a high priority but during the planning stages of this project several major unresolved factors were identified such as the construction of a new Events Center on the Ithaca College Campus adjacent to Coddington Road and the impending Reconstruction of the Aurora Street Bridge which is located just north of the Coddington Road project limits. These factors are anticipated to change many of the dynamics and traffic patterns at the north end of the project corridor and so the County decided it would be prudent to wait until these projects have been fully completed to settle on a preferred design alternative north of Troy Road.

The first Phase of construction (using currently available construction funds) will be the southerly portion of the project between Stations 1+365 and just south of the Troy Road intersection at about Station 4+120.

Table III-7 describes the breakdown of the proposed work in phases.

Project Sections	Phase 1	Phase 2
South Limit to South of Community Center (1+000 to 1+365)		$549,000
South of Community Center to Troy Road (1+365 to 4+120)	$4,815,000	
Troy Road to North Limit (4+120 to 5+995)		$3,432,000
Construction Costs	$4,815,000	$3,981,000
Total	**$8,796,000**	

Table III-7 Construction Costs – Preferred Alternative

3. Engineering Considerations of Feasible Alternative.

a) Special Geometric Features

The preferred alternative will meet the geometric requirements set forth in the Design Criteria, Section III.A of this report.

From the Danby line to Burns Road, Coddington Road is classified as a Rural Collector. The standard design speed for this section of the roadway based on the classification and the 85th percentile speeds is 90 km/h. However a 90 km/h

design speed is not feasible from economic, logistical or context sensitivity perspectives. Therefore the feasible alternative uses a 70 km/h design speed throughout the entire project with the exception in the vicinity of the Community Center where the design speed has been reduced to 60 km/h to coincide with the approved speed reduction. These exceptions should be considered as non-conforming features which can be justified by the lack of accident history and the implementation of NYSDOT context sensitivity and traffic calming directives as discussed in the Highway Design Manual. These measures should aid in the reduction of the operating speeds along Coddington Road. See section III.B.3 of this report for further discussion of this topic.

b) Non Standard Features Retained

There are several non-standard features which will be retained as part of the preferred alternative. A 70km/hr design speed according to the Highway Design Manual states a 3.3 meter (11ft) minimum lane width. The manual also states that the minimum shoulder width is 1.5 meters (5ft). The preferred alternative will include a 3.3 meter (11ft) lane width and a 1.2 meter (4ft) shoulder width. This design exception is part of the project's desire to implement traffic calming techniques and context sensitive design. The 85th percentile speeds of vehicular traffic along Coddington Road currently exceed the posted speed limits by an average of about 10mph. Traffic calming techniques such as providing a travel way which feels more enclosed will help limit the traffic speeds along Coddington Road. The existing roadway corridor is fairly narrow with important mature trees and shrubbery which line the roadway. A narrower pavement section limits the impact on the surrounding properties and helps the road blend more harmoniously with its environment.

The minimum Lateral Clearance along the project is 3.0 meters (10ft) measured from the edge of traveled way. This lateral clearance would then include the proposed shoulder width of 1.2meters (4ft) and an additional width beyond the shoulder of 1.8 meters (6ft). The vast majority of the project will be in compliance with this standard, but there are several mature trees which will remain within the standard clear zone. These design exceptions are also part of the Context Sensitive and Traffic Calming design techniques employed by the projects preferred alternative. The existing trees along the project are considered a very valuable asset to the individual property owners along Coddington Road which provide privacy, screening, noise abatement and traffic calming benefits. The accident data does not suggest that these trees have been a significant factor in the accidents which have occurred along Coddington Road. The only other exceptions to the standard lateral clearance along Coddington Road will be at the larger cross culverts along the project that require guiderail. These barrier protected locations will reduce the lateral clearance to 1.2 meters (4ft) which is the minimum allowable under a rail protected condition according to the Highway Design Manual.

c) Traffic Forecasts, Level of Service and Safety Considerations

The design of the overall project will meet the geometric requirements set forth in the New York State Department of Transportation "Highway Design Manual" (HDM) and American Association of State Highway and Transportation Officials (AASHTO) "A Policy on Geometric Design of Highways and Streets" with the exceptions noted in the report. Adhering to these criteria will ensure that minimum safe sight distances are introduced and horizontal curves are designed for safe maneuvering - minimum radii will be used and appropriate super elevations will be designed into proposed horizontal curves.

Coddington Road currently contains nonstandard vertical geometry. The existing sight distance is so poor in some locations that a car traveling at 45 mph has less than 2 seconds of reaction time before impacting a still obstruction in the roadway. The proposed improvements to Coddington Road include vertical realignments that will bring existing sight distances along the project limits up to acceptable standards. This will greatly improve the safety of Coddington Road.

Level of Service analysis indicates that there are no outstanding traffic congestion issues. Coddington Road will continue to operate at a high level of service beyond the design year 2027. However review of accident history and comparisons to State Wide average accident rates indicate that some safety issues need to be addressed. The accident rate along Coddington Road should decrease by improving sight distances especially at the Burns Road, East King Road and at Updike Road intersections. Other safety improvements will include increasing the clear zone and providing guide rail in appropriate locations, and improving signage and pavement markings along the project.

d) Pavement

The geotechnical investigation included a pavement design for the proposed pavement based on the projected traffic volumes for the project. Based on the pavement design calculations, the proposed pavement will consist of a combination of asphalt and subbase stone with a total thickness of approximately 515mm (20.5 inches). The subbase thickness will be approximately 350mm (14 inches) and the total asphalt thickness will be approximately 165mm (6.5 inches) thick. The pavement design also recommends installing a geotextile fabric over the compacted subgrade.

The borings have revealed that the existing pavement thicknesses are insufficient in most locations. The subbase material has also been identified as containing significant amounts of undesirable materials such as fine, silty material which would not be a strong candidate for full depth reclamation. When you combine these facts with the proposed changes in finished grade along the project, there would be only a few locations where a conventional "pavement rehabilitation"

such as full depth reclamation would be feasible. In most locations the existing asphalt along the project could be milled, stored as necessary, and recycled as subbase material. This recycled material will only be used in the lower 100mm to 125mm (4-5 inches) of the proposed subbase as an "optional subbase course". The exact recycled thickness will be determined during final design based on the projected amount of milled asphalt. The remaining required subbase material will be new crushed stone per NYSDOT specifications. New asphalt will be installed to achieve the remaining pavement section. The proposed pavement section is based on a 30 year Design Life as defined in the NYSDOT Comprehensive Pavement Design Manual.

e) Structures

There are no structures within the project limits. Eight of the 26 cross culverts along the project are significant in diameter (between 1200mm (48") and 2400mm (96"). Several of these culverts may be treated as small structures or box culverts depending on the most efficient design solution.

f) Hydraulics

Anticipated runoff values from 26 contributing drainage areas were calculated using the Rational Method. Every cross culvert was hydraulically evaluated to determine if it has adequate capacity to convey a 50-year storm event (per NYSDOT standards) under existing conditions. First, the estimated capacity of each cross culvert was determined using Manning's Equation.

In cases where storm water is directed to the cross culvert through a natural stream, additional evaluation was performed to determine if the cross culvert has the ability to function at full capacity. This additional evaluation looked at headwater and tail water elevations in accordance with the Federal Highway Administration HEC-5. The Federal Highway Administration, HY8 software (or the U.S. Army Corps. of Engineers HEC-RAS software) was used to perform this evaluation.

Proposed cross culverts will be at least 610 mm (24 inches) in diameter and be designed to convey a 50-year storm event. Non-circular culverts will be considered when road elevation and required pipe cross sectional area will not allow for the height of a circular pipe. Culverts needing replacement, either because of poor condition or lack of capacity will likely be replaced during the reconstruction of the roadway above them.

g) Drainage

Adequate pavement slopes and cross slopes will be specified to allow stormwater to run off the roadway. A system of shallow swales, gutters, curbs, inlets, storm

sewers and under drains will be designed to convey stormwater away from the roadway corridor. The storm water will flow off the roadway, into a combination of open and enclosed drainage systems. A detailed plan of these storm water systems will be developed during final design.

Existing and proposed runoff flows will be compared to ensure that the proposed system can store or recharge a portion of the peak flow ensuring that the peak storm water flow is not increased by the proposed improvements. In addition storm water quality will be addressed in accordance with the most recent NYSDEC requirements.

h) Maintenance Responsibility

Tompkins County will be responsible for the maintenance of Coddington Road. This will include routine items (such as drainage and snow removal) as well as long term repair issues (such as periodic repairs to pavement). Public utilities such as water and sewer will remain the responsibility of the Town of Ithaca.

i) Maintenance and Protection of Traffic

The contractor will be required to maintain at least one lane of alternating two-way traffic along the entire project corridor. Further maintenance of traffic plans and details will be developed during the final design stages of the project. Phasing the work to limit the area of disturbance will help minimize the length of the alternating traffic and the extent of inconvenience to the residents of Coddington Road.

j) Geotechnical

The geotechnical report does indicate the presence of shallow rock near the north end of the project. Careful consideration must be given to the cost associated with excavations in these areas. In addition there are sections of Coddington Road which contain corrosive soil conditions based on the DIPRA 10 point testing performed as part of our investigations. Any utility replacements should take this fact into consideration as well.

k) Utilities

This project will likely have some sporadic impact on the existing utilities along Coddington Road due to pavement widening, enclosed drainage system installation, etc. All utilities affected by changes in finished grade elevations will be replaced (per governing agency guidelines) as required.

Portions of the feasible alternative will require the replacement of existing water main due to significant elevation changes which will result in insufficient depth of

cover. Existing sewer manholes will need to be adjusted to proposed grades. Any effected private service laterals will need to be adjusted or replaced and the existing gas and water valves will need to be adjusted to proposed grades.

Private utility companies have already been contacted as part of the initial investigations. Preliminary plans will be sent to the utility companies to further coordinate any necessary private utility relocation.

l) Right-of-way

There are a total of 60 expected permanent easements for the portion of Alternative 6 between station 1+370 and Troy Road. See *Appendix E* for a complete list of easements and their approximate individual areas. During detailed design and ROW acquisition phases, consideration will be given to utilizing temporary easements in areas that involve only minor grading and reserve permanent easements for areas with severe cuts and fills. *Table III-8* summarizes the breakdown of ROW costs based on the two phases of work as depicted in *Table III-5* above.

Project Sections	Phase 1	Phase 2
South Limit to South of Community Center (1+000 to 1+365)	---	$4,000
South of Community Center to North of Troy Road (1+365 to 4+120)	$56,000	---
North of Troy Road to North Limit (4+120 to 5+955)	---	$66,000
ROW Acquisition Costs per Phase	**$56,000**	**$70,000**
Total ROW Acquisition Costs	**$126,000**	

Table III-8 ROW Acquisition Costs – Preferred Alternative

m) Landscaping Provisions

Landscaping provisions will be an important consideration for the preferred alternative. The operating speeds along Coddington Road are approximately 10mph above the posted speed limit and implementing traffic calming measures along the project will be a key element to the success of the project design. One important traffic calming measure will be the use of new trees and other landscaping as discussed in section III.B.3 of this report. Landscaping along the road creates an enclosed feeling and helps reduce the driver's tendency to speed. Detailed landscaping plans will be developed during final design phase.

n) Provisions for Pedestrians, including Persons with Disabilities

Proposed pedestrian facilities will meet the standards set forth by the American Disabilities Act (ADA). These facilities will also be designed per accepted guidelines presented in the New York State Department of Transportation "Highway Design Manual" (HDM).

The feasible alternative proposes sidewalks to be installed from the Ithaca College entrance to just north of the City of Ithaca line where the existing sidewalk ends at the intersection of Hudson Street and Pennsylvania Avenue. The exact location and configuration of the sidewalk would be developed after consideration of the Citizens' Advisory Group's comments. Curbs would be utilized to offer a safe separation of pavement and sidewalk. Ramps will be installed to allow sidewalk access to persons with disabilities. Cross walks will be proposed in appropriate locations to protect pedestrian safety.

o) Provisions for Bicycling

Proposed facilities for bicycle traffic will be designed in accordance with the American Association of State Highway and Transportation Officials (AASHTO) "Guide for the Development of Bicycle Facilities" and the Highway Design Manual guidance for bicycle facilities along Urban Collectors.

The feasible alternative may provide 1.2 meter (4ft) paved shoulders on each side of the road. This will not only provide a safe edge of travel way for vehicles, it also will provide a stable surface for a bicyclist that is separate from the vehicle travel lanes. The exact configuration of the shoulders would be developed after consideration of the Citizens' Advisory Group's comments.

D. Project Costs and Schedule

1. Costs

The costs for each alternative are given in *Table III-9*. An 8% contingency was used to account for the preliminary stage of the estimate.

	Current Project Funding	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	**Alt. 6 (Preferred Alt.)**
		Null	90 km/h	70 km/h	Reconstruct In Kind	70 km/h Plus Traffic Calming	**60 - 70 km/h**
Phase 1- Road Construction (Portion to be built with available funds)	**$ 4,535,000**	n/a	$4,933,000	$4,136,000	$3,102,000	$4,894,000	**$4,815,000**
Phase 1 ROW Acquisition	**$491,000**	n/a	$93,000	$74,000	$10,000	$55,000	**$56,000**
Phase 1 Total	**$5,026,000**	n/a	$5,026,000	$4,210,000	$3,112,000	$4,949,000	**$4,871,000**
Phase 2- Road Construction (Future funding required)	**$3,981,000**	n/a	$5,897,000	$6,669,000	$5,002,000	$5,137,000	**$3,981,000**
Phase 2 ROW Acquisition	**$70,000**	n/a	$73,000	$59,000	$10,000	$78,000	**$70,000**
Phase 2 Total	**$4,051,000**	n/a	$5,970,000	$6,728,000	$5,012,000	$5,215,000	**$4,051,000**
Grand Total (Phase 1 & 2)	**$9,077,000**	n/a	$10,996,000	$10,938,000	$8,124,000	$10,164,000	**$8,922,000**

Table III-9 Project Costs

2. Schedule

Tompkins County anticipates the following schedule:

Submit Final Design Report	August 2007
Design Approval	August 2007
ROW Acquisition Authorization	August 2007
Complete Final Design	November 2007
ROW Acquisition Certification	December 2007
Advertise Project	January 2008
Project Letting	February 2008
Begin Construction	April 2008
Complete Construction	November 2008

CHAPTER IV

SOCIAL, ECONOMIC AND ENVIRONMENTAL CONSIDERATIONS

FINAL DESIGN REPORT

CODDINGTON ROAD
(COUNTY ROUTE 119)

DANBY TOWN LINE TO CITY OF ITHACA LINE

TOWN OF ITHACA
TOMPKINS COUNTY, NEW YORK

NYSDOT PIN 3753.24

AUGUST 2007

IV. SOCIAL, ECONOMIC AND ENVIRONMENTAL CONSIDERATIONS

A. Introduction

This section discusses the anticipated environmental considerations of the proposed reconstruction of Coddington Road (County Road 119), which extends from the south boundary line of the City of Ithaca to the shared boundary line of the Towns of Ithaca and Danby, in Tompkins County, New York. Design Alternatives have been evaluated, and a preferred alternative recommended for the reconstruction of Coddington Road that will satisfy the project objectives. Refer to the Regional Map and Project Location Map, included in *Appendix A*, for site location.

B. NEPA Classification

The project is classified as a Class II action under United States Department of Transportation (USDOT) National Environmental Policy Act (NEPA) Regulations, 23 CFR 771.117(d). A NEPA checklist was prepared for the project and the checklist is attached in *Appendix G*. The project complies with the requirements of a Programmatic Categorical Exclusion.

C. SEQR Classification

This project is classified as a Type I Action (over 20 acres of disturbance) in accordance with 6NYCRR Part 617, State Environmental Quality Review (SEQR) Act, and the Tompkins County will act as the lead agency. A long-form Environmental Assessment Form (EAF) was completed for the project and the EAF is also attached in *Appendix G*. Based on this information, the project is identified as one that will not have a significant effect on the environment, and as such, further environmental review under SEQR is not required.

D. Social Consequences

1. Affected Population

The population in the vicinity of the Coddington Road Project is primarily residential in nature. There is a community center located just south of the Burns Road intersection which provides meeting space and a child daycare facility. There is also a hike and bike trail located to the east of the project limits. The project recommendations include improving some pedestrian access and way-finding signage for the trail, as well as general roadway pedestrian accommodations. Traffic calming should also affect speed reductions through residential areas. There are no negative consequences which will affect the local population.

2. Local planning

The Town of Ithaca has been included in the scoping and planning process for the Coddington Road Project and they have provided the County with mixed feed back about

the preferred alternative. The Town has endorsed the project's plan to install a sidewalk from the existing sidewalk just north of the City line to at least the Ithaca College entrance. The Town Transportation Plan also affirms the need for bicycle and pedestrian accommodations between the City line and Troy Road.

3. Community Cohesion

Improved bicycle and pedestrian accommodations along Coddington Road will create a positive impact to the character of the adjacent neighborhood resulting from project completion. Property values should be positively affected with an improvement in the quality of life as result of project completion. Improved safety and sight distances at the Coddington Road Community Center will enhance its usefulness.

4. Changes in Travel Patterns or Accessibility

The installation of 1.2meter (4ft) paved shoulders, which will serve as a pedestrian and bicycle friendly facility, will improve accessibility along the southern portions of the project. Installation of the sidewalk from Juniper Drive to the existing sidewalk termination just north of the City line will provide a "closed loop" for pedestrians using the hike and bike trail located just east of the project vicinity. A connection between the proposed sidewalk and an Ithaca College walkway which ends at the west side of Coddington Road is also proposed **to** connect Ithaca College's **pedestrian facilities** with the existing sidewalks in the City of Ithaca. In addition, existing vehicular travel patterns will not be significantly impacted as a result of this project.

5. Impacts on Highway Safety

The Coddington Road Project will have a positive impact on highway safety by improving the sight distances along the project, by providing an appropriate travel lane width and by providing a paved shoulder capable of supporting bicycle and pedestrian traffic. These positive impacts will also likely include a sidewalk in the vicinity of the Ithaca College entrance

6. Other Impacts

There are no other known impacts to entities such as school districts, recreation areas, and places of worship, emergency services, other social groups or area businesses.

E. Economic Impacts

The Coddington Road Improvements will have a positive economic impact on the local and regional economy. Once the Coddington Road pavement is returned to a good condition with a service life of 30 years, the movement of goods, services, and people through the community and to and from the nearby City of Ithaca will be improved which will reduce commuter and transportation costs.

There will be no displaced households or businesses associated with the project improvements.

F. Environmental Screenings and Preliminary Investigations

1. General Ecology and Wildlife

The lands in the immediate vicinity of and adjacent to the northern portion of the project corridor generally consist of suburban residential areas. Rural residential properties with intermittent vacant lands and agricultural land use are located at the southern portion of the project corridor. A majority of the outlying areas are vacant undeveloped properties with intermittent residential properties and developments.

The New York State Department of Environmental Conservation (NYSDEC) Wildlife Resources Center Natural Heritage Program and the NYSDEC Region 7 Division of Fish, Wildlife and Marine Resources office were contacted regarding the presence of significant habitat areas and endangered and threatened species. The NYSDEC Wildlife Resources Center Natural Heritage Program office responded that there are no known occurrences of rare or state-listed animals or plants, significant natural communities, or other significant habitats, on or in the immediate project vicinity.

The NYSDEC Region 7 office responded that according to New York State, there are six (6) vascular plants, one (1) invertebrate animal, and one (1) Community that are either threatened or endangered. The dates that these species were last reported range from June 1845 to August 1999. However, based on the locations of the species mapped by the NYSDEC, it appears that they are located far enough away from the corridor and will not be impacted by the project.

The United States Department of Commerce National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service and the United States Department of the Interior Fish and Wildlife Service (USFWS) were contacted regarding the possible presence of threatened and endangered species and habitat areas. The USFWS responded that except for occasional transient individuals, no federally listed or proposed endangered or threatened species under USFWS jurisdiction in the project impact area. The NOAA responded in October 2005 stating that no endangered or threatened species under the NOAA jurisdiction are located within the project area. See *Appendix B* for the NOAA correspondence.

2. Ground Water

This project is not located within the limits of a designated U.S. Environmental Protection Agency Sole Source Aquifer. The project appears to be located adjacent to a New York State Primary/Principal aquifer as identified in Kantrowitz and Snavely (1982). It is anticipated that the project will not impact traffic volumes or road deicing operation and application rates that would increase potential contaminant loads discharged to tributaries of Six-mile Creek. Therefore, supplemental groundwater investigations in accordance with the Safe Drinking Water Act of 1974 will not be required.

The majority of the residences located along the project corridor appear to be serviced by public water. Evidence of public water service was observed during the August 25, 2005 site reconnaissance.

Erosion, sedimentation and water pollution controls identified in the Storm Water Pollution Prevention Plan (SWPPP) will be employed throughout the duration of the project to minimize water quality impacts in groundwater recharge areas. Therefore, the overall quality of groundwater is not anticipated to be affected by this project.

3. Surface Water

Several tributaries of Six-mile Creek are the major surface water bodies situated along the project corridor. The NYSDEC stream classification for these water bodies, as contained in 6 NYCRR, Chapter X, and 6 NYCRR Part 703, is Class A Fresh Surface Waters and the water quality standard is A. The best use of Class A waters is a source of water supply for drinking, culinary or food processing purposes, and the waters are suitable for primary and secondary contact recreation. The water quality is also suitable for fish propagation and survival.

It is anticipated that design alternatives will maintain existing overall surface water drainage patterns and the project will not significantly increase pavement surface areas utilized for vehicle and pedestrian use. Thus, significant increases in the surface water runoff rates and volumes are not anticipated as a result of the proposed highway improvements and construction; however, this will be verified during the storm water control calculations. Additionally, the water class indicates that a NYSDEC stream bed and bank disturbance permit will be required by the NYSDEC for the proposed rehabilitation to the culverts carrying these streams under Coddington Road.

It is also noted that the Town of Ithaca and Tompkins County are designated as a regulated Municipal Separate Storm Sewer Systems (MS4). However, it is anticipated that a NYSDEC State Pollutant Discharge Elimination System (SPDES) Permit for Construction will be required as the total project disturbance is expected will exceed the threshold disturbance area of 0.4–hectares (1.0-acre). The Project will also require a NYSDEC Section 401 Water Quality permit.

During construction, storm water runoff from exposed soil surfaces may flow into the existing surface water conveyance system and subsequently into adjacent surface water streams. These flows will be controlled by the use of sediment and erosion control techniques. These techniques will be part of a sediment and erosion control plan to be implemented during construction and will conform with the requirements of the NYS Department of Transportation Standard Specification for Temporary Soil Erosion and Water Pollution Control and the NYS Guidelines for Urban Erosion and Sediment Control, provided as part of the final contract documents in conjunction with the SPDES Construction requirements noted above. As part of the SPDES requirements, a Notice of

Intent (NOI), Erosion and Sediment Control Plan, and a Storm Water Pollution Prevention Plan (SWPPP) will be required.

4. State Wetlands

The NYSDEC wetland map for the Ithaca East, NY Quadrangle was reviewed. There were no NYSDEC designated wetlands identified along or immediately adjacent to the project corridor. Therefore, construction activities in conjunction with the Coddington Road Reconstruction project are not anticipated to impact NYSDEC regulated wetlands.

5. Federal Wetlands

A copy of the National Wetland Inventory (NWI) Map prepared for the Ithaca East, NY Quadrangle prepared by the U.S. Department of Interior, Fish and Wildlife Service was also reviewed. The mapping identifies five (5) unnamed tributaries to Six-mile Creek that intersect Coddington Road within the project area, as "Waters of the United States" and are, therefore, riverine wetlands under federal jurisdiction. Depending on the preferred design alternative, potential disturbance associated with construction activities may exceed the reporting threshold limit and require the issuance of USACE permits.

6. Historic/Cultural Resources

The available record information reveals that there are no historic buildings/structures or districts currently identified on the National Historic Registry along the project corridor. However, a number of the homes have been inventoried by the New York State Division for Historic Preservation, New York State Office of Parks, Recreation and Historic Preservation (OPRHP). Therefore, a Phase IA/1B Archeological Reconnaissance Survey was completed for the Coddington Road reconstruction corridor.

The Phase 1A/1B was conducted by Pratt & Pratt Archeological Consultants, Inc. of Cazenovia, New York. The Phase 1A/1B Archaeological Reconnaissance Survey was conducted in two separate phases and forwarded to the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) for their review and concurrence. The NYSOPRHP responded with letters dated April 7, 2006 and January 12, 2007 indicating that the project will have No Effect on cultural or historic resources in the area. See *Appendix B* for correspondence with SHPO.

7. Parks

The project will not require acquisition of additional right-of-way (ROW) that is currently used as a public park, recreation area, wildlife or waterfowl refuge. Therefore, Section 4(f) evaluations are not required.

The reconstruction project will not require acquisition of nor does it impact any recreational parks federally funded by the United States Department of the Interior. Therefore, Section

6(f) evaluations are not required.

8. Contaminated Materials Assessment

A Hazardous Waste/Contaminated Materials (HW/CM) Assessment was completed for the project corridor. The primary objective of this assessment was to render an opinion as to whether surficial or historical evidence indicates the presence of recognized environmental conditions that could result in the presence of hazardous materials in the environment. The assessment was completed in general accordance with the February 2001 Environmental Procedures Manual (EPM) guidelines prepared by the New York State Department of Transportation - Environmental Analysis Bureau.

Public information was obtained from various federal, state, and local agencies that maintain environmental regulatory databases. These databases provide information about the regulatory status of a property and incidents involving use, storage, spilling or transportation of oil or hazardous materials. The search distances for the federal, state and local databases were established in ASTM E 1527-00 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, based on the extent and previous land use of the project corridor. *Table 1* and *Table 2* list, but are not limited to, the specific databases containing information for the project corridor. For reference, a Regional Map and Project Location Map are included in *Appendix A*.

Table No. 1 - Federal Database Summary

Database	Radius Searched
National Priorities List (NPL Database)	1.6 km (1 – mile)
Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS Database)	1.6 km (1 – mile)
Resource Conservation and Recovery Act (RCRA) Corrective Action Sites (CORRACTS) TSD Facilities (CORRACTS Database)	1.6 km (1 – mile)
RCRA Non-CORRACTS - TSD Facilities (RCRIS TSD Database)	0.8 km (0.5 – mile)
RCRA Generators (RCRIS-LQG and SQG Database)	0.4 km (0.25-mile)
Emergency Response Notification System (ERNS)	Site and adjoining properties

Table No. 2 - State Database Summary	
Database	Radius Searched
LTANKS Spills Information	0.8 km (0.5 – mile)
SHWS Inactive Hazardous Waste Disposal Sites	1.6 km (1 – mile)
SWF/LF Facility Register	1.6 km (1.0 – mile)
UST Petroleum Bulk Storage	0.4 km (0.25-mile)
CBS UST Chemical Bulk Storage Database	0.4 km (0.25-mile)
MOSF UST Major Oil Storage Facilities Database	1.6 km (1 – mile)
Voluntary Cleanup Agreements (VCP)	1.6 km (1 – mile)
NY Spills	0.8 km (0.5 – mile)

Based upon a review of available historic documentation, site observations, historic aerial photographs and topographic maps, the project corridor does not appear to have been used for the storage, treatment or disposal of hazardous waste or substances. The National Priorities List (NPL); Resource Conservation and Recovery Act (RCRA) - TSD (CORRACTS); Resource Conservation and Recovery Information System – Treatment, Storage and Disposal Facility (RCRIS-TSD); Emergency Response Notification System (ERNS); Solid Waste Facilities/Landfills (SWF/LF); UST Petroleum Bulk Storage; Major Oil Storage Facilities (MOSF UST); and Brownfield Sites databases indicate that there are no sites within the ASTM search distances.

A review of the July 2004 Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) database indicated that there are no CERCLIS sites listed along the project corridor. The database identified one site, Morse Industrial Corp. (NYS Route 96B), located within the search radius. The property is located northwest of the project corridor. The Project corridor appears to be located topographically and hydraulically up gradient from the CERCLIS site.

A review of the May 2000 Hazardous Substance Waste Disposal Site database indicated that there are no Hazardous Substance Waste Disposal Sites listed along the project corridor. The database identified one site, Ithaca College (Danby Road), located within the search radius. The property is located west/northwest of the project corridor. The northern portion of the project corridor appears to be located topographically and hydraulically up gradient from the Hazardous Substance Waste Disposal Site, while the southern portion of the project is topographically up gradient and hydraulically cross gradient.

A review of the July 2005 Active Hazardous Spill database indicated that there are no Active Hazardous Spill sites located along the project corridor. The database identified

one site, Emerson Power Transmission (620 South Aurora Street), located within the search radius. The property is located northwest of the project corridor. The Project corridor appears to be located topographically up gradient and hydraulically up gradient from the Active Hazardous Spill site.

A review of the June 2004 Hazardous Waste Generator/Transporter database indicated that there are no Hazardous Waste Generator/Transporter sites located within the project corridor. The database identified two sites, Therm Inc. (100 Hudson Street Extension) and Town of Ithaca (165 Pearsal Place), located within the search radius. The properties are located north/northwest of the project corridor. The project corridor appears to be located topographically up gradient and hydraulically up gradient from the Hazardous Waste Generator/Transporter sites.

A review of the January 2002 CBS UST Chemical Bulk Storage database indicated that there are no CBS UST Chemical Bulk Storage sites located along the project corridor. The database identified one site, Therm Inc. (Hudson Street Extension), located within the search radius. The property is located north/northwest of the project corridor. The Project corridor appears to be located topographically up gradient and hydraulically up gradient from the CBS UST Chemical Bulk Storage site.

A general site reconnaissance was conducted on August 25, 2005 to make observations of surficial conditions and to observe possible evidence of recognized environmental conditions, which could result in the presence of hazardous materials in the environment. Visual observations made during the site reconnaissance did not reveal any recognized environmental concerns that would impact the proposed project.

Fisher Associates also reviewed historic aerial photographs for the years 1955, 1964-65, 1978 and 1981. There were no potential adverse environmental impacts identified on the historic topographic maps reviewed.

It should be noted that when an assessment is completed without subsurface explorations and chemical screening of soil and groundwater beneath the site, no data could be generated regarding latent subsurface conditions, which may be the result of on-site or off-site sources.

It is also noted that should suspect materials be uncovered during construction, appropriate precautions should be taken, including subsurface explorations and analytical laboratory testing within the corridor to identify the potential presence and composition of onsite materials.

9. Asbestos Assessment

An asbestos assessment was conducted for the project corridor. The primary objective of the assessment was to determine the potential for encountering Asbestos Containing Materials (ACMs) in areas that may be affected by the proposed construction. The

asbestos assessment was completed in general accordance with the February 2001 New York State Department of Transportation Environmental Analysis Bureau EPM, Volume II, Chapter 1.3 and the project scope.

Visual observations made during the site reconnaissance did not reveal any buildings or structures along the corridor that would be impacted by the proposed project. It is anticipated that the proposed project will not require the demolition of any existing buildings or structures along the project corridor. Therefore, further investigation of ACM is not warranted at this time.

Utility as-built maps for the project corridor were reviewed. Notes on the mapping provided by the Town of Ithaca identifies the Sanitary sewer as '8" asbestos cement sewer' and the water main as being 8" ductile iron pipe. The record plans provided by other utilities do not identify the type of material used. If the preferred project alternative proposes to disturb this sanitary sewer pipe, construction activities should be conducted by a New York State Department of Labor (NYSDOL) certified asbestos contractor under NYSDOL Industrial Code Rule (ICR) 56. No other asbestos containing materials were identified on the as-built mapping reviewed.

As with all construction, should materials be uncovered during construction that are suspected of containing asbestos, appropriate precautions should be taken and sampling and analysis of the materials for asbestos content should be immediately conducted by a New York State DOL Certified Asbestos Inspector.

10. Farmland Screening

Based on information received from the Tompkins County Planning Department, the southern portion of the project corridor is adjacent to the Tompkins County Agricultural District No. 1. Therefore, if permanent easements or property acquisitions are required, the project may have to be advanced in compliance with the NYS Agriculture and Markets Law.

Several soil types located within the potential area of disturbance are defined as prime or unique agricultural soils by the United States Department of Agriculture National Resources Conservation Service. Therefore, if permanent easements or property acquisitions are required such that land use is changed to a non-agriculture use, a Notice of Intent and Natural Resources Conservation Service (NRCS) Form AD-1006 may be required.

11. Anticipated Permits and Approvals

Specific and/or general permits and approvals may be required for the project. Potential permits and approvals are summarized below:

- NYSDEC State Pollution Discharge Elimination System (SPDES) permit for construction activities; Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP).
- Joint USACE/NYSDEC permit.
- US Corps of Engineers §404 Permit (Nationwide or Individual Permit).
- NOI & NRCS – Form AD-1006

The specific permitting and coordination activities are a function of the final highway configuration and design. It is noted that although specific permits may not be required, coordination with several agencies (City of Ithaca, Town of Ithaca, SHPO, USACE, and NYSDEC) may be required for various project activities. The anticipated permits identified above include activities/permits that may not be required, depending on the final design.