

# Table of Contents

<b>ES</b>	<b>Executive Summary</b> .....	ES-1
<b>1.0</b>	<b>Introduction</b> .....	1-1
1.1	Background of Freight Transportation .....	1-1
1.2	Organization of Report.....	1-3
<b>2.0</b>	<b>Project Approach</b> .....	2-1
2.1	Data Collection and Inventory .....	2-1
2.2	Data Analysis and Development of the Chittenden County Freight Profile. ....	2-9
2.3	Development of the Freight Demand Model and Additional Modeling Tools.....	2-11
2.4	Recommendations and Final Report .....	2-15
<b>3.0</b>	<b>County Freight Profile</b> .....	3-1
3.1	Economic and Demographic Data .....	3-1
3.2	Modal Profiles.....	3-8
<b>4.0</b>	<b>Commodity Flows and Logistics Patterns</b> .....	4-1
4.1	Commodity Flow Analysis .....	4-1
4.2	Logistics Patterns of Shippers and Receivers in Chittenden County .....	4-21
<b>5.0</b>	<b>Evaluate the Feasibility of Operating Intermodal Facilities</b> .....	5-1
5.1	Definition of Intermodal for the Statewide and Regional Freight Studies ....	5-1
5.2	Existing Conditions.....	5-2
5.3	Review of Intermodal Freight Data .....	5-9
5.4	Considerations for Intermodal Expansion .....	5-12
5.5	Recommendations.....	5-19
<b>6.0</b>	<b>Findings, Conclusions, and Recommendations</b> .....	6-1
6.1	Findings and Conclusions.....	6-1
6.2	Recommendations and Next Steps .....	6-5

# Table of Contents (continued)

**Appendix A**

Literature Review

**Appendix B**

Documentation of Reebie Data

**Appendix C**

Survey Instruments

**Appendix D**

Interview Participants

**Appendix E**

Methodology for Evaluating Freight Transportation Projects

**Appendix F**

Data Needs and Methodology for a Modal Diversion Analysis

**Appendix G**

Glossary

# List of Tables

2.1	Data Needs and Data Collection Methodology .....	2-4
4.1	Description of an Ice Cream Manufacturer .....	4-25
4.2	Description of a LTL Truck Operation .....	4-27
4.3	Description of a High Tech Manufacturer .....	4-29
5.1	Identification of Major Intermodal Rail Connections.....	5-7
5.2	Vermont Intermodal Traffic .....	5-10
5.3	Rail Mode Share for Selected Commodities (in Tons).....	5-11
5.4	Vermont Double-Stacked Clearance Restrictions .....	5-12
5.5	Conceptual Costs by Route .....	5-13
5.6	Out-of-State Double-Stacked Clearance Restrictions .....	5-14

# List of Figures

2.1	Project Organization .....	2-2
2.2	External Commodity Flow Analysis Regions .....	2-5
2.3	Internal Commodity Flow Analysis Regions .....	2-5
2.4	Location of Roadside Survey Sites.....	2-7
3.1	Unemployment Rates for Chittenden County, 1990-1999 .....	3-2
3.2	Unemployment Rates by County, 1998.....	3-3
3.3	Employment Growth, 1990-1998.....	3-4
3.4	Change in Population, 1990-1999 .....	3-4
3.5	Annual Average Wages, 1998.....	3-6
3.6	Manufacturing Share of Total Employment.....	3-6
3.7	Manufacturing Employment Density by County, 1998.....	3-7
3.8	Regional Freight Terminals Within 500 Miles of Chittenden County .....	3-8
3.9	Vermont Truck Network.....	3-11
3.10	Truck Volumes on Chittenden County’s Highways .....	3-12
3.11	Generators of Heavy Truck Trips in Chittenden County .....	3-13
3.12	Key Entry and Exit Gateways.....	3-14
3.13	Pick-Up and Drop-Off Locations of Drivers Interviewed on I-89 Southbound in Colchester .....	3-15
3.14	Pick-Up and Drop-Off Locations of Drivers Interviewed on US 7 Northbound in Charlotte .....	3-15
3.15	Size of Commercial Fleets in Vermont .....	3-17
3.16	Major Use of Vermont-Based Commercial Vehicles .....	3-17
3.17	Trailer Utilization by Vermont Carriers.....	3-18
3.18	Total Vehicle Length of Vehicles Recorded During Roadside Survey .....	3-19

## List of Figures (continued)

3.19	Top 10 Base States of Motor Vehicles Surveyed at the Roadside .....	3-19
3.20	Vermont Rail Network and Ownership and Location of Airports .....	3-22
3.21	Vermont Railway’s Burlington Rail Yard .....	3-24
3.22	Vermont Railway’s Bulk Transfer Equipment in Burlington.....	3-24
3.23	Burlington International Airport.....	3-26
4.1	Total Freight Flows in Chittenden County by Type of Movement.....	4-2
4.2	Mode Shares for All Freight Flows Into, Out of, and Within Chittenden County	4-4
4.3	Mode Shares for All Freight Flows Into Chittenden County .....	4-4
4.4	Mode Shares for All Freight Flows Out of Chittenden County .....	4-5
4.5	Top Commodities in Chittenden County .....	4-6
4.6	Top Truck Commodities in Chittenden County .....	4-6
4.7	Top Rail Commodities in Chittenden County .....	4-7
4.8	Major Trading Partners .....	4-9
4.9	Destinations of Total Outbound Commodity Flows -- Regional.....	4-10
4.10	Destinations of Total Outbound Commodity Flows -- National.....	4-10
4.11	Origins of Total Inbound Commodity Flows -- Regional.....	4-11
4.12	Origins of Total Inbound Commodity Flows -- National.....	4-11
4.13	Origins of Total Inbound Rail Commodity Flows .....	4-12
4.14	Origins of Total Outbound Rail Commodity Flows.....	4-12
4.15	Commodity Flows by County .....	4-13
4.16	Destinations of Total Inbound Commodity Flows .....	4-14
4.17	Origins of Total Outbound Commodity Flows.....	4-14
4.18	Top Commodities Moving Through Vermont.....	4-16

## List of Figures (continued)

4.19	Top Commodities Moving Through Vermont by Truck .....	4-16
4.20	Top Commodities Moving Through Vermont by Rail.....	4-17
4.21	Origins of Total Commodity Flows Moving Through Vermont .....	4-17
4.22	Destinations of Total Commodity Flows Moving Through Vermont .....	4-18
4.23	Chittenden County Freight Flows (Comparison of Weight and Value by Commodity) .....	4-19
4.24	Illustration of Ice Cream Manufacturer Logistics Patterns National View .....	4-24
4.25	Illustration of Ice Cream Manufacturer Logistics Patterns Regional View .....	4-24
4.26	Illustration of LTL Truck Operation Logistics Patterns .....	4-26
4.27	Illustration of High Tech Manufacturer Logistics Patterns .....	4-28
5.1	Existing East-West Intermodal Connections from West Coast Ports.....	5-3
5.2	Regional View of Existing East-West Intermodal Connections.....	5-3
5.3	Intermodal Yard .....	5-4
5.4	Loading of a Container onto a Rail Flatcar (COFC) .....	5-4
5.5	Loading of a Trailer onto a Rail Flatcar (TOFC).....	5-5
5.6	Double-Stack Operation (Two Stacked COFC).....	5-5
5.7	Rail Intermodal Growth .....	5-10